CHAPTER 11

MATERIEL SYSTEM RESEARCH, DEVELOPMENT, AND ACQUISITION MANAGEMENT

"Modernizing the U.S. Army is more than just enhancing and developing new weapons platforms. It is the examination of the future of warfare and new operations concepts made possible by advanced technology. We are focusing on the soldier as both a subsystem of our aircraft and ground vehicles, and as a system himself. We have empowered our Army acquisition professionals to continuously find smarter ways to doing business, and we are seeing good results."

Paul J. Hoeper, Assistant Secretary of the Army (Acquisition, Logistics, and Technology)

SECTION I
INTRODUCTION

11-1. Department of Defense (DOD) and U.S. Army management system

This chapter describes the DOD and U.S. Army management system used for the research, development, and acquisition (RDA) of materiel systems, both major defense acquisition (MDAP) systems and major systems. As a result of the *Federal Acquisition Streamlining Act* (FASA) of 1994 and the DOD process action team (PAT) efforts to re-engineer the acquisition oversight and review process, the current materiel systems acquisition structure within DOD and the Army is in a state of change. Major system acquisition policy changes resulting from these activities are currently being integrated into the DOD and Army materiel acquisition systems. That system can be viewed simply as a combination of structure, process, and culture.

- Structure is the sum of the guidance provided by law, policy, regulation or objective, and the organization provided to accomplish the RDA function.
- Process is the interaction of the structure in producing the output.
- Culture is the cumulative sum of past practices and their impact on interpretation of guidance and attitude toward institutional changes to the system.

11-2. System focus

For the Army, the focus of materiel acquisition management output is producing military units that are adequately trained, equipped, and maintained to execute National Military Strategy (NMS) effectively. The focus of the RDA management system is the development and acquisition of systems that are affordable and support the enforcement of our NMS. The RDA management system is a fully coordinated effort concerned with the total fielding of a system consisting of hardware, software, logistic support, manuals, organizations, doctrine, facilities,

personnel, training, and spares. Figure 11-1 shows the elements of systems acquisition management. To facilitate an understanding of the process, this chapter will begin by highlighting some of the critical aspects of structure.

System	Acquisition	Management
• Hardware	• Determine Need	• Plan
• Software	• Design	• Organize
• Logistic Support	• Develop	• Staff
• Manuals	• Test	• Control
• Organizations	• Produce	• Lead
• Doctrine	• Field	
• Facilities	• Support	
• Personnel	• Improve	
• Training	• Replace	
• Spares	• Dispose	

Figure 11-1. Systems Acquisition Management Individual Elements

SECTION II
DOD ORGANIZATION AND MANAGEMENT

11-3. DOD policy

a. The basic policy is to ensure that acquisition of defense systems is conducted efficiently and effectively in order to achieve operational objectives of the U.S. Armed Forces in their support of national policies and objectives within the guidelines of the Office of Management and Budget (OMB) Circular A-11, part 3, Major System Acquisitions. DOD Directive 5000.1, The Defense Acquisition System, and DOD Instruction 5000.2, Operation of the Defense Acquisition System, are the documents that provide the DOD guidance for system acquisition policy and procedure. These documents establish an integrated management framework for a single, standardized DOD-wide acquisition system that applies to all programs including highly sensitive, classified programs. Within the DOD system there are four acquisition program-size categories with decision authority placed at the lowest practical level. The system is characterized by three activities, four phases, eight work efforts, and four milestones (discussed later in the chapter) which track a DOD program's progress throughout its development and program life. "Tailoring" is encouraged in the process to reflect specific program needs. In accordance with DODD 5000.1 "One size does not fit all." The essential features of the DOD materiel acquisition system are:

- A clear acquisition strategy (AS).
- A thorough program plan.
- Risk management techniques.
- Systematic program tracking against the plan.

b. An acquisition program is defined as a directed, funded effort designed to provide a new, improved or continuing weapon system or automated information system (AIS) capability in response to a validated operational need. Acquisition programs are divided into different categories, which are established to facilitate decentralized decision-making, and execution and

compliance with statutory requirements. Acquisition phases provide a logical means of progressively translating broadly stated mission needs into well-defined system-specific requirements and ultimately into operationally effective, suitable, and survivable systems. All the tasks and activities needed to bring the program to the next milestone occur during acquisition phases. A milestone (MS) is the major decision point that initiates the next phase of an acquisition program. MDAP milestones may include, for example, the decisions to begin concept and technology development, or to begin low-rate initial production.

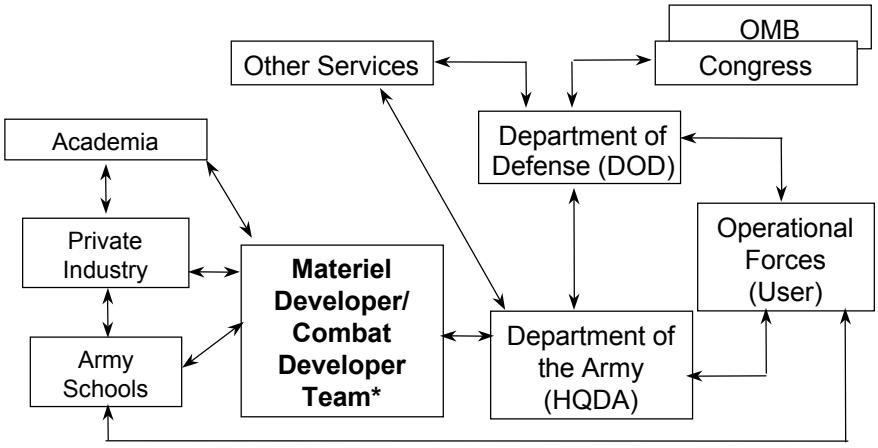
11-4. DOD acquisition management

a. The Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) is the senior procurement executive and the principal staff assistant and adviser to the Secretary of Defense (SecDef) and takes precedence in DOD for all matters relating to the materiel acquisition system: research and development, production, logistics; command, control, and communications, and intelligence activities related to acquisition; military construction; and procurement.

b. The USD(AT&L) serves as the Defense Acquisition Executive (DAE) with responsibility for supervising the performance of the entire DOD acquisition system in accordance with the laws, Congressional guidance and direction, and OMB Circular No. A-11, part3. The DAE establishes policy for all elements of DOD for acquisition. The basic policies of the DAE are established and implemented by Department of Defense Directive (DODD) 5000.1 and Department of Defense Instruction (DODI) 5000.2. The DAE also serves as the chairman of the Defense Acquisition Board (DAB), assisted by overarching integrated product teams (OIPTs) that relate to the acquisition process. As DAB chairman, the DAE recommends to the SecDef acquisition resource matters and other acquisition management matters required to implement acquisition milestone decisions. A clear distinction exists between responsibility for weapon systems acquisition and budgetary authority. While the DAE, as DAB Chairman, makes recommendations on whether to proceed with plans to acquire major materiel systems, the Defense Resources Board (DRB), chaired by the Deputy Secretary of Defense (DepSecDef), makes budgetary recommendations on the same programs. Acquisition programs must operate within the parameters established by the DRB and the SecDef through the Planning, Programming, and Budgeting (PPBS) process.

11-5. Organizational linkage

The managerial process of transforming a materiel requirement into a fielded and supported system consisting of hardware, software, and personnel is conducted by various organizational structures in DOD and the Services responsible for RDA. Figure 11-2 shows the primary elements involved for the Army, including the linkage between the defense community, industry, and academia. The arrows in the Figure depict the flow of business in the process of this transformation.



* Materiel Developer includes Program Executive Officers (PEOs); Program, Project, Product Managers (PMs); and the U.S. Army Materiel Command (AMC). The Army's primary Combat Developer is U.S. Army Training and Doctrine Command (TRADOC). TRADOC Battle Labs, Integrated Concept Teams (ICTs), and Integrated Product Teams (IPTs) support the MATDEV/CBTDEV Team.

Figure 11-2. Organizational Linkage for Army Materiel Acquisition

11-6. DOD science and technology

Since World War II, owning the technology advantage has been a cornerstone of our National Military Strategy (NMS). Technologies like radar, jet engines, nuclear weapons, night vision, global positioning, smart weapons, and stealth have changed warfare dramatically. Maintaining this technological edge has become even more important as U.S. force size decreases and high technology weapons become readily available on the world market. In this new environment, it is imperative that U.S. forces possess technological superiority to ensure success and minimize casualties across the broad spectrum of engagements. The technological advantage enjoyed by the United States in Operation Desert Storm in 1991, and still enjoyed today, is the legacy of decades of wise investments in science and technology (S&T). Similarly, our warfighting capabilities 10 to 15 years from now will be substantially determined by today's investment in S&T.

11-7. Defense science and technology strategy

The Defense Science and Technology Strategy is supported by the DOD Basic Research Plan (BRP), DOD Joint Warfighting Science and Technology Plan (JWSTP), Defense Technology Area Plan (DTAP), and Defense Technology Objectives (DTOs) of the Joint Warfighting Science and Technology Plan and Defense Technology Area Plan. It provides DOD's S&T vision, strategy, plan, and a statement of objectives for the planners, programmers, and performers. Revised annually, these documents and the supporting individual S&T master plans of the Services and defense agencies guide the annual preparation of the DOD S&T budget and program objective memoranda (POMs).

a. The Basic Research Plan (BRP) presents the DOD objectives and investment strategy for DOD-sponsored Basic Research (6.1) performed by universities, industry, and Service laboratories. In addition to presenting the planned investment in 12 technical discussion areas, this year's plan highlights six strategic research objectives (SROs) holding great promise for enabling breakthrough technologies for 21st century military capabilities.

b. The Joint Warfighting Science and Technology Plan (JWSTP) objective is to ensure that the S&T program supports priority future joint warfighting capabilities. The JWSTP looks horizontally across the Services and agencies and together with the DTAP ensures that the near-, mid-, and far-term needs of the joint warfighter are properly balanced and supported in the S&T

planning, programming, budgeting, and assessment activities of DOD. The JWSTP is focused around 12 Joint Warfighting Capability Objectives (JWCOs). These objectives support the Joint Requirements Oversight Council (JROC), Joint Warfighting Capabilities Assessment (JWCA) process, and the four leveraged concepts emphasized in the Joint vision: dominant maneuver, precision engagement, full-dimension protection, and focused logistics. The JWSTP is issued annually as defense guidance. Advanced concepts and technologies identified as enhancing high priority joint warfighting capabilities, along with prerequisite research, receive funding priority in the President's Budget and accompanying Future Years Defense Program (FYDP).

c. The DOD Technology Area Plan (DTAP) presents the DOD objectives and the Applied Research (6.2) and Advanced Technology Development (6.3) investment strategy for 12 technology areas critical to DOD acquisition. It takes a horizontal perspective across Service and agency efforts, thereby charting the total DOD-wide investment for each technology area. The DTAP documents the focus, content, and principal objectives of the overall DOD science and technology efforts. The 2000 DTAP, includes an assessment of the potential technology capabilities of other countries vis-a-vis the United States.

d. The focus of the S&T investment is enhanced and guided through Defense technology objectives (DTOs). Each DTO identifies a specific technology advancement that will be developed or demonstrated, the anticipated date of technology availability, and the specific benefits resulting from the technology advance. These benefits not only include increased military operational capabilities but also address other important areas, including affordability and dual-use applications that have received special emphasis in the Defense Science and Technology Strategy. Each of the 326 DTOs identifies funding required to achieve the new capability. Over seventy percent of the DTOs are identified and described in the DTAP, which cites the anticipated return on the S&T investment through 12 broad technology areas. The remaining DTOs support the 12 JWCOs of the DOD JWSTP. JWSTP DTOs are limited to advanced technology demonstrations (ATD) and advanced concept technology demonstrations (ACTD) discussed later in this chapter.

11-8. Defense Advanced Research Projects Agency (DARPA)

DARPA is a unique management tool of the SecDef. It consists of a mix of military and civilian scientists and engineers, and has a broad charter to conduct advanced research which fills research and development (R&D) gaps between Service lines of responsibility or handles high priority problems that cross Service lines. DARPA is charged with the maintenance of leadership in forefront areas of technology so DOD can be aware as soon as possible of developments of potential military significance. DARPA's purpose is to review ongoing research and development, determine whether or not the concept is feasible, determine its usefulness, and transfer it to the appropriate Service. DARPA does not have its own in-house research facilities and relies on the Services and other government agencies for technical and administrative support. Once a decision to support a research proposal is made, responsibility for contracting is generally assigned to one of the Services.

11-9. Defense Acquisition University (DAU)

The DAU is a corporate university that includes the Defense Systems Management College (DSMC). Its operation and structure is designed to be similar to a State university with many campuses each specializing in certain acquisition disciplines. The *Defense Acquisition Workforce Improvement Act (DAWIA)* required the formation of the DAU with operation commencing in 1992. Also, the law required the establishment of a senior course for personnel serving in critical acquisition positions (CAPs) that are equivalent to existing senior professional military education

programs. The USD(AT&L) has oversight authority for the acquisition curriculum of the course, located at the Industrial College of the Armed Forces (ICAF) of the National Defense University.

11-10. Defense Systems Management College (DSMC)

The DSMC is the USD(AT&L) institution for ensuring the up-to-date training of military and civilian professionals in the management of materiel acquisition programs in DOD. One such course is the Advanced Program Management Course (APMC), a required 14-week course for individuals seeking Level III certification in the Program Management Acquisition Career Field (ACF).The DSMC, founded 1971, is a joint military professional institution, operating under the direction of the DAU Executive Board, to support acquisition management as described in DOD Directive 5000.1, and to assist in fulfilling education and training requirements set out in appropriate DOD directives and public laws. The mission of the DSMC is to—

a. Conduct advanced courses of study in defense acquisition management as the primary function of the college.

b. Conduct research and special studies in defense acquisition management.

c. Assemble and disseminate information concerning new policies, methods, and practices in defense acquisition management.

d. Provide consulting services in defense acquisition management.

SECTION III
ARMY ORGANIZATION AND MANAGEMENT

11-11. Army's RDA goals

a. The Secretary of the Army (SA) is responsible for functions necessary for the research, development, logistical support and maintenance, preparedness, operation, and effectiveness of the Army. Also required is supervision of all matters relating to Army procurement. The SA executes acquisition management responsibilities through the Army Acquisition Executive (AAE).

b. Special emphasis is placed on medium and long-range materiel planning, product modification, and life extension programs. Major state-of-the-art advancements are sought only in carefully selected areas. Stability of materiel acquisition programs is a matter of utmost interest, especially after the system passes the System Development and Demonstration milestone decision. Reliability, availability, and maintainability (RAM) goals; manpower and personnel integration (MANPRINT); integrated logistics support (ILS); survivability; effectiveness; safety; and product quality are incorporated into system performance objectives. Contractual incentives for the improvement of RAM and ILS are encouraged.

11-12. Army Acquisition Executive (AAE)

The Assistant Secretary of the Army (Acquisition, Logistics, and Technology) (ASA(ALT)) is the AAE. The AAE is designated by the SA as the Component Acquisition Executive (CAE) and the senior procurement executive within Department of the Army (DA). The AAE is the principal DA-staff official for the execution of the AAE responsibilities. When serving as the AAE, the ASA(ALT) is assisted by a military deputy (MILDEP) and the Director of Information Systems for Command, Control, Communications, and Computers (DISC4).

a. The MILDEP is assigned to the Office of the ASA(ALT) and provides staff support to the AAE in managing the research development, developmental test, and the acquisition of

materiel for all Army major weapon and support systems. The MILDEP, delegated down from the AAE, is the Army's Director, Acquisition Career Management (DACM). The DACM is responsible for directing the Army Acquisition Corps (AAC) as well as implementation of the acquisition career management requirements set forth in the DAWIA legislation.

b. The DISC4 provides staff support to the AAE in managing the research, development, and acquisition of automated information systems (AIS) (includes automation, telecommunications, and command and control) and information technologies (IT). The DISC4 also serves as the Army Chief Information Officer (CIO) as directed in the *Information Technology Management Reform Act (ITMRA) of 1996*. The CIO primary responsibility, under ITMRA, is the management of resources for all Army information programs. The day-to-day management of Army acquisition programs is shown in Figure 11-3.

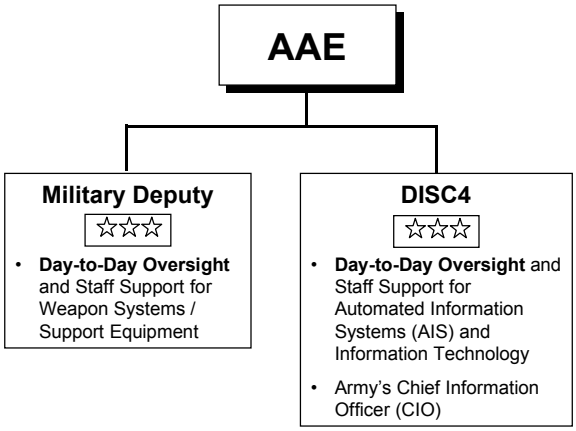


Figure 11-3. Army Acquisition Executive (AAE)

c. Similar to the DAE, the AAE develops Army acquisition policies and procedures and manages the Army's production base support and industrial mobilization programs. The AAE, acts with the full authority of the SA is responsible for administering acquisition programs according to DOD policies and guidelines, and exercises the powers and discharges the responsibilities as set forth in DODD 5000.1 for component acquisition executives. In addition, the AAE will:

(1) Appoint, supervise and evaluate program executive officers (PEOs) and direct-reporting program, project, or product managers (PMs).

(2) Coordinate with Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS), establish policy and guidance for analysis of alternatives (AoAs); for army category (ACAT) I and II programs, designate the organization responsible for performing system engineering trade-off analyses for the AoA; and provide issues and alternatives to ODCSOPS for inclusion in the AoA tasking document. ACATs are described in Figure 11-4.

(3) Carry out all powers, functions, and duties of the SA with respect to the acquisition work force within the Army, subject to the authority, direction, and control of the SA.

(4) Develop guidance, in coordination with the ODCSOPS, and serve as co-proponent for the RDA plan.

(5) Formulate Army-wide S&T base strategy, policy, guidance, and planning.

(6) Establish and validate Army technology base priorities throughout the planning, programming, budget, execution system (PPBES).

(7) Approve and resource Army advanced technology demonstrations (ATDs) and the Advanced Concepts and Technology II (ACT II) Program.

(8) Act as the final authority of all matters affecting the Army's acquisition system, except as limited by statute or higher-level regulation.

(9) Develop and promulgate acquisition, procurement, and contracting policies and procedures.

(10) Co-chair all Army System Acquisition Review Council (ASARC) meetings with the Vice Chief of Staff, U.S. Army (VCSA).

(11) Establish and implement Army horizontal technology integration (HTI) policy.

(12) Appoint the source selection authority (SSA) for specified programs. The Federal Acquisition Regulation (FAR) is the primary contracting regulation. It is the first regulatory source to which DA acquisition personnel refer. The ASA(ALT) issues the Army Federal Acquisition Regulation Supplement (AFARS) to implement and supplement the FAR and the Defense Federal Acquisition Regulation Supplement (DFARS) and to establish uniform policies and procedures for use in the Army.

Program Category	Program Management	Primary Criteria $ = FY 00 Constant	Milestone Review Forum	Milestone Decision Authority
ACAT I				
ACAT ID	PEO/PM	RDTE > $365M PROC > $2.19B	DAB	DAE
ACAT IC	PEO/PM	RDTE > $365M PROC > $2.19B	ASARC	AAE
ACAT IA				
ACAT IAM	PEO/PM	Single Year > $32M or Total Program > $126M or Total Life-Cycle Costs > $378M	DOD IT OIPT	DAE/CIO
ACAT IAC	PEO/PM	Single Year > $32M or Total Program > $126M or Total Life-Cycle Costs > $378M	Army ITOIPT	AAE/CIO
ACAT II				
ACAT II	PEO/MAT CMD DSA /PM	RDTE > $140M PROC > $660M	ASARC	AAE
ACAT III				
ACAT III	PEO/MAT CMD DSA /PM	High Visibility; Special Interest	IPR	PEO/MAT CMD DSA
ACAT IV				
ACAT IV	System Manager, or Equivalent	All Other Acquisition Programs (includes AIS)	IPR	MAT CMD CDR

Figure 11-4. Acquisition Categories

(13) Review and approve, for ACAT ID programs, the Army position at each decision milestone before the DAB review. This includes the review and approval of acquisition program baselines (APBs). The AAE also serves as the milestone decision authority (MDA) for ACATs IC, II, and assigns the MDA for ACAT III and IV programs. The MDA is the individual designated to approve entry into the next phase; this decision is made for each milestone used in a program.

(14) Approve the establishment and termination of all program management offices (PMO) and PEOs. The AAE has authority to designate a system for intensive, centralized management and prescribe the appropriate level of management at any point in the program management process.

d. The DA system coordinator (DASC) is the primary acquisition staff officer at DA. The DASC is responsible for the day-to-day support of his or her assigned program and serves as the PM's representative and primary point of contact (POC) within the Pentagon. Depending on whether the system or program falls within the purview of the DISC4 or ASA(ALT), the responsible DASC may report to either the Vice Director, Information Systems for Command, Control, Communications, and Computers (VDISC4) or the ASA(ALT), Deputy for Systems Management and Horizontal Technology Integration (HTI). The DASC is responsible for keeping the acquisition chain of command (ASA(ALT)) or DISC4) informed of the status of the assigned acquisition program. In addition, the DASC assists the PM in issue resolution at DA and Office Secretary of Defense (OSD) levels. The DASC is the "eyes and ears" of the PM at the Pentagon and ensures that the PM is advised of any actions or circumstances that might negatively impact their program.

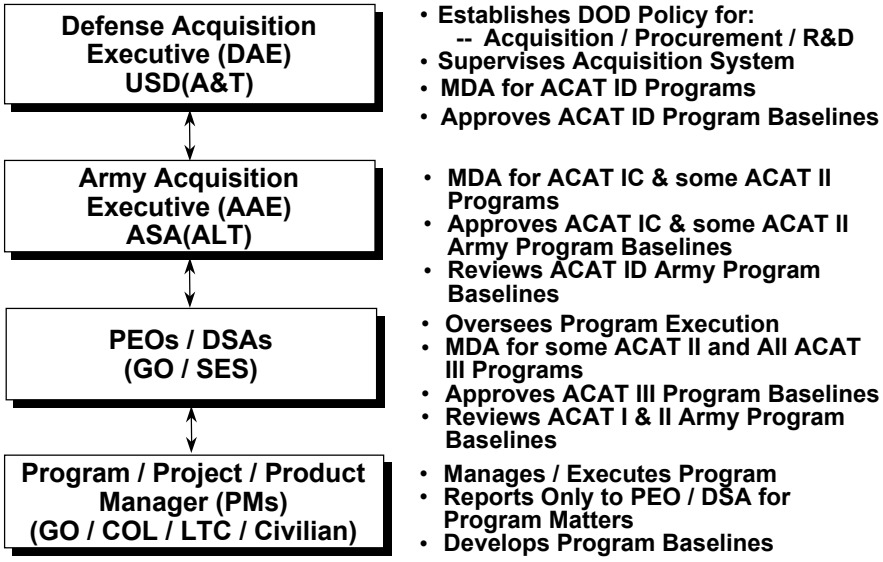
11-13. The program executive officer (PEO)

a. The PEO system structure was implemented by the Army in 1987 in response to requirements established by the *Goldwater-Nichols Reorganization Act of 1986,* and the recommendation of the Packard Commission which the President approved and then ordered by NSDD 219 (Figure 11-5). The PEO and direct-reporting PMs serve as materiel developers (MATDEVs).

b. The PEO, administering a defined number of AAE assigned major and/or non-major programs, is responsible for making programmatics (materiel acquisition cost, schedule, and total system performance) and for the planning, programming, budgeting, and execution necessary to guide assigned programs through each milestone. In addition, the PEO provides program information to the AAE, HQDA, DOD, and Congress; defends assigned programs to Congress through the Army legislative and budget liaison offices; and participates in the development of data to support AAE programmatic decisions in the PPBES. Other PEO and direct-reporting PM responsibilities include assisting the combat developer (CBTDEV) and training developer (TNGDEV) in developing operational requirements documents (ORDs) by providing technical, availability, performance, anticipated materiel acquisition cost, and schedule type information as needed.

c. The AAE currently has eight PEOs—Air and Missile Defense; Aviation; Command, Control, and Communications Systems; Intelligence and Electronic Warfare; Ground Combat and Support Systems (GCSS); Standard Army Management Information Systems; Reserve Component Automation Systems (reports to Chief, National Guard Bureau); and Tactical Missiles—responsible for the intensive management of RDA weapon and information systems.

Figure 11-5. DOD Acquisition Authority Chain



d. To support the expanded acquisition mission within Army Materiel Command (AMC), the SA approved the establishment of three new brigadier general positions titled, "Deputy for Systems Acquisition (DSA)." The positions are located at the U.S. Army Communications-Electronics Command (CECOM), Fort Monmouth, NJ; the U.S. Army Tank-automotive and Armaments Command (TACOM), Warren, MI, and the U.S. Army Aviation and Missile Command (AMCOM), Redstone Arsenal, AL. The DSAs develop command policy and plans, and manage the integration, coordination, and execution of systems acquisition and project management missions. The DSA positions have full line authority of the AAE and the appropriate AMC major subordinate command (MSC) CG in carrying out systems acquisition and project management activities.

e. The CBTDEV, referred to above, is the U.S. Army Training and Doctrine Command (TRADOC). TRADOC formulates and documents operational concepts, doctrine, organizations, and/or materiel requirements for assigned mission areas and functions. Materiel requirement documents are mission need statements (MNSs), capstone requirements documents (CRDs), and ORDs. The CBTDEV serves as the user representative during acquisitions for their approved materiel requirements as well as doctrine and organization developments.

f. A MATDEV is the RDA command, agency, or office assigned responsibility for the system under development or being acquired. The term may be used generically to refer to the RDA community in the materiel acquisition process (counterpart to the generic use of CBTDEV). A TNGDEV is a command or agency that formulates, develops, and documents or produces training concepts, strategies, requirements (materiel and other), and programs for assigned mission areas and functions. TNGDEV serves as user (trainer and trainee) representative during acquisitions of their approved training materiel requirements (MNS, CRDs, and ORDs) and training program developments. They perform the following functions solely in support of training systems:

(1) Fund and conduct concept formulations for all system training aids, devices, simulations and simulators (TADSS) in support of assigned system.

(2) Embed system-training capabilities into assigned materiel systems in accordance with the approved system ORD and in coordination with the CBTDEV/TNGDEV.

(3) Develop, acquire, and field the subsystem training package with the materiel system.

(4) Plan and program resources for the execution of new equipment training (NET) using distance learning (DL) technology and/or contract NET as the desired training strategy in support of TRADOC developed/approved system training plan (STRAP).

(5) Program and budget resources for TADSS as specified in the training support requirements (TSR) annex of the ORD.

(6) Program and budget resources to support and ensure attention to and integration of MANPRINT in the research, development, test, and evaluation (RDTE) and acquisition processes.

(7) Provide TNGDEV perspective through input to the RDA plan and the Army modernization plan (AMP).

(8) Lead the cost-performance integrated product team (CPIPT) to institute the cost as independent variable (CAIV) process beginning with the approval of the MNS.

(9) Conduct a crosswalk, with the CBTDEV (TNGDEV for TADSS), of the ORD to the request for proposal (RFP) to verify that the RFP, to include system specification or purchase description and the statement of work (SOW), accurately reflects the operational requirements stated in the ORD for all programs. The MATDEV and CBTDEV (MATDEV and TNGDEV for TADSS) will formally certify that the RFP has been crosswalked with the ORD and is in agreement prior to the ASARC or program review.

11-14. The program/project/product manager (PM)

a. The program management approach to materiel acquisition management is a distinct departure from the Services' traditional practice of establishing functionally oriented organizations to carry out well-defined, repetitive, and continuous long-term tasks. Organization for program management is a tailored, task-oriented process. This approach requires the program manager to establish management arrangements among the PMO, other military organizations, and various contractors to coordinate their efforts and to accomplish program objectives effectively, efficiently, and economically. A variety of PMO organizations have been established. They operate on the matrix management principle and must draw all functional support from a host command or installation. In addition to the formal PM organization, the PM directs the informal MATDEV/CBTDEV team to execute the assigned materiel acquisition program. MATDEV/CBTDEV team is the terminology used to describe the informal, but essential close working relationship among the MATDEV, CBTDEV, and other players in the RDA management process (Figure 11-2).

b. The PM has authority and responsibility for all programmatic cost, schedule, and performance decisions to execute the assigned program within the approved APB and subject to functional standards established by regulation, Secretarial direction, or law. Generically, all PMs are program managers, but they are chartered as a program manager, a project manager, or product manager based on the value and importance of the program they manage. The criteria established for designation of a program manager are generally the same as those which cause a system acquisition to be designated as a major program—high defense priority, high dollar value, or high Congressional or OSD interest. Most program managers report to a PEO and to the AAE. Project and product managers report to a program manager or a PEO. The Army also has many PMs who report to AMC and U.S. Army Space and Missile Defense Command (USASMDC). Their programs are usually more mature systems or programs that have been through production and fielding. As a general rule, a program manager is a general officer or Senior Executive Service (SES); a project manager is a colonel or GS 15; a product manager is a

lieutenant colonel or GS 14. This distinction between PMs is unique to the Army and does not apply to the other Services or within industry.

11-15. PEO resource control

The Army has revised its resource support system structure for the PEOs to improve their control over the funding and manpower resources they need to carry out their responsibilities. PEOs and subordinate PMs receive dollars and personnel authorization resources directly from HQDA rather than through the materiel commands. The materiel commands continue to provide a variety of support services without duplicating any of the PEOs or PMs management functions. This enhanced resource control system ensures PEO and PM-managed programs operate as centers of excellence, managed with modern efficient techniques, without administrative burdens or materiel command layers being inserted into the chain of command.

11-16. Acquisition career management

a. The MILDEP to the ASA(ALT) serves as the Army DACM. The DACM is assisted by the Deputy Director, Acquisition Career Management (DDACM) and the Acquisition Career Management Office in OASA(ALT). The Deputy Assistant Secretary of the Army (Civilian Personnel Policy) and the Deputy Chief of Staff for Personnel work closely with the DACM in implementing the requirements and intent of DAWIA for the Army.

b. The AAC was established for both military and civilian personnel and is a subset of the entire Army acquisition workforce (AAW). The AAW consists of those personnel who work directly with acquisition in the various acquisition career fields at the CPT/GS-5 and above levels. The AAC consists of military and civilian personnel at the rank/grade of MAJ/GS-13 and above who have met the statutory requirements for experience, education and training. Current Army policy focuses on accessing individuals at the GS-14 and above level into the AAC. All AAW positions at rank/grade of LTC/GS-14 and above are designated critical acquisition positions (CAPs) and must be occupied by AAC members. For program management and contracting positions, statute or regulation further dictates education, training, and experience requirements which must be met prior to placement of an individual in these positions.

(1) *AAC vision.* The strategic vision for the AAC forms the foundation for all policies and initiatives impacting the AAW. This vision is to develop "a small premier professional corps of acquisition leaders willing to serve where needed and committed to developing, integrating, acquiring and fielding systems critical to decisive victory…for the 21st century." The vision focuses on "a small premier professional corps of acquisition leaders...It is these leaders the Army must develop early in their careers to ensure they possess the requisite experience and skills to successfully manage the acquisition challenges of the 21st century." The key to developing the best possible leaders for the Army lies in educating the workforce, particularly at the lower levels, as to the DAWIA requirements and the policies, procedures, and tools available to meet those requirements.

(2) *Career development as a mission.* The leader development career pattern for an AAC officer is clearly defined and highly rewarding. Military acquisition career development is covered under DA Pamphlet 600-3, Commissioned Officer Professional Development and Utilization. An officer should normally serve eight years in branch qualifying assignments prior to entering the AAC. Upon AAC selection, the officer will attend functional area (FA) specific military training courses, and selected officers will have the opportunity to attend advanced civil schooling (ACS). Attendance at ACS is contingent on the officer's manner of performance, potential for academic success, and support of his or her career time line. Graduate level education opportunities are an important part of career development within the AAC. However,

job experience and strong performance across a variety of acquisition positions remains the key indicator for success. Recent initiatives seek to increase developmental acquisition experience opportunities while providing improved support for alternative advanced degree schooling. AAC officers compete for product/project management or acquisition command positions in the same manner as field commands. AAC LTCs and COLs are ineligible for selection to non-acquisition command positions. For career development of civilians, the Army has developed a civilian acquisition career model as well as a matrix of quality achievement factors as a "roadmap for success." The focus of the career model is to begin to develop acquisition leaders and managers early in their careers, giving them a broad-based knowledge of the various acquisition functions supported by leadership and management experience. The quality achievement factors are the combination of training, education, and experience at the higher grade.

11-17. Headquarters, Department of the Army (HQDA)

a. Chief of Staff of the Army (CSA). The CSA is responsible by law to the SA for the efficiency of the Army and its preparedness for military operations. The CSA acts as the agent of the SA in carrying out the plans or recommendations submitted by the ARSTAF and approved by the SA. The VCSA supports the CSA by managing the day-to-day operations of the Army, and specifically in the area of RDA, co-chairs the ASARC with the AAE.

b. Deputy Under Secretary of the Army (Operations Research)(DUSA(OR)). The DUSA (OR), designated Army Test and Evaluation (T&E) Director, establishes, reviews, supervises and enforces Army T&E policy and procedures; oversees all Army T&E associated with RDA, as well as combat development programs; provides staff management (policy formulation, program direction, and resource oversight) of all T&E programs of interest to OSA; approves all test and evaluation master plans (TEMPs) requiring HQDA approval; and is responsible for all software development for modeling and simulations and software T&E policy.

c. Assistant Secretary of the Army (Financial Management and Comptroller) (ASA(FM&C)). The ASA(FM&C) has secretariat responsibility for all financial management activities and operations for appropriated funds. While the budget is in preparation, the ASA(FM&C) receives and consolidates procurement and RDTE budget forms from major Army commands (MACOMs) and PEOs. The ASA(FM&C) also:

(1) Represents the AAE on all cost and economic analysis matters related to the acquisition process.

(2) Carries out all financial management responsibilities assigned under Title 10.

(3) Tasks the appropriate CBTDEV or MATDEV to conduct program office estimates (POE) and/or economic analyses (EA) to milestone decision review (MDR) and PPBES requirements.

(4) Manages all budgeting activities in support of the Army materiel requirements processes and RDA modernization program, with the framework of PPBS/PPBES.

(5) Provides oversight, review and approval for all costing and economic analysis efforts, as carried out by the U.S. Army Cost and Economic Analysis Center (CEAC) within the Cost and Economic Analysis Program to include preparation of the component cost analysis (CCA).

(6) For ACAT I and special interest programs the ASA(FM&C) establishes an Army cost review board (CRB) of senior leadership to review the life-cycle cost estimates and recommend the Army cost position (ACP). The ASA(FM&C) Deputy for Cost Analysis ensures

that the ACP reflects the costs and risks associated with the program in concurrence with the (CAIV) process.

d. Assistant Chief of Staff for Installation Management (ACSIM). The ACSIM is responsible for developing criteria for the mitigation of environmental impacts, and reviewing emerging Army RDA systems for environmental effects.

e. Director of Information Systems for Command, Control, Communications, and Computers (DISC4). The DISC4 is the Army CIO and has ARSTAF responsibility and serves as the MILDEP to the AAE for Army AIS and IT activities. These include establishing and approving policies, procedures, and standards for the planning, programming, life-cycle management, use of Army IT resources, and responding to and validating all warfighting requirements. The DISC4—

(1) Validates all IT related to MNS, ORD, and operational need statement (ONS) by ensuring that they meet three criteria.

(2) They conform to the Joint Technical Architecture-Army (JTA-A) and address integration into Army Enterprise Architectures.

(3) The requirement has gone through business process reengineering (BPR).

(4) They are in concert with emerging command, control, communications, computers, and intelligence (C4I) technologies.

(5) They are consistent with joint interoperability requirements.

(6) Oversees the activities of PEOs or PMs managing command, control, communications, and computer and IT acquisition programs.

(7) Has overall responsibility for Army software policy for both AIS and weapon systems.

(8) Provides technical oversight for both AIS and weapon systems on software and IT matters during the acquisition approval process.

(9) Directs and approves standards for data and interoperability of products, to include joint and combined programs.

(10) Provides software R&D advice and management oversight for all systems during the ASARC and the Information Technology Overarching Integrated Product Team (ITOIPT).

(11) Reviews materiel system programs and warfighting rapid acquisition program (WRAP) candidate systems for compliance with HQDA policy for software reuse, technical and systems architectures, data element standardization, post production software support, interoperability, spectrum management, and software initiatives.

(12) Ensures proper implementation of the ILS and MANPRINT programs in IT.

f. Deputy Chief of Staff for Programs (DCSPRO).

(1) In November 2000, Congress approved the creation of the DCSPRO. The creation of the new office was the result of the HQDA Headquarters Redesign, Phase I efforts based on the CSA guidance to base reorganization on process and AR 10-5 ARSTAF functions, not current organization structure. Effective 1 December 2000 the DCSPRO:

(a) Received Director of Program Analysis and Evaluation (DPAE),

(b) Received Assistant Deputy Chief of Staff for Operations and Plans – Force Development (ADCSOPS-FD) minus Force Programs Directorate, (renamed Assistant Deputy Chief of Staff for Programs – Force Development (ADCSPRO-FD)),

(c) Established a clearinghouse for all internal and external Army studies,

(d) Established an infrastructure for external review teams (i.e. Quadrennial Defense Review (QDR)),

(e) Works JROC/JWCA issues,

(f) Works approved/validated materiel requirements from DCSOPS.

(g) Integrates unit-set fielding.

(2) As of this update, the HQDA Headquarters Redesign, Phase I Implementation Plan and AR 10-5 are being developed. The updated AR 10-5, when approved, will impact the roles and responsibilities discussed in this chapter, especially within ODCSOPS and ODCSPRO.

(3) Within ODCSPRO, the Director of Program Analysis and Evaluation (DPAE) is responsible for reviewing and analyzing requirements and programs in force structure development, providing analytical support to the Army Resources Board (ARB) and subordinate committees, developing resource guidance, developing and compiling the program objective memorandum (POM), maintaining the Army portion of the DOD FYDP, and presenting an affordability analysis to the ASARC and OIPT. Other responsibilities include conducting and presenting affordability assessments to support DOD and HQDA ACAT I programs and managing the programming phase of the PPBES.

(4) Within ODCSPRO, the systems integrator (SI) is the focal point for ODCSOPS approved materiel requirements and the CBTDEV's primary representative and POC in the Pentagon. The SI provides the continuous coordination necessary to ensure the integration of new warfighting materiel systems into Army organizations. SIs are appointed by the ADCSPRO-FD.

(a) The SI integrates operational, training, doctrinal, organizational, personnel, logistical, and test and evaluation aspects to ensure the fielding of a complete, coordinated, and supportable system. The SI ensures that systems are doctrinally based and that they are properly reflected in approved tables of organization and equipment (TOEs). SI duties include developing a DA position on proposed materiel requirement documents and basis-of-issue plans (BOIPs) and identifying, in coordination with U.S. Army Test and Evaluation Command (ATEC), the required operational and force development tests.

(b) The SI monitors the progress of an assigned system throughout its developmental process to ensure that approved materiel requirements are staffed and satisfied. In addition, the SI ensures necessary logistical support, manpower spaces, and training packages are available when and where the system enters the inventory. The overall objective is to meet the first unit equipped (FUE) / initial operational capability (IOC) dates with an operationally suitable, reliable, maintainable, and economically obtainable system. The first unit equipped date (FUED) is the date when the system and associated equipment is fielded (in operational quantities complete with logistical support, and training support) to the IOC unit and new equipment training (NET) is accomplished. The IOCD is the first attainment of warfighting capability of modification TOE (MTOE) and supporting elements to operate and support a fielded RDA system.

(c) The SI is also responsible for the management of requirements which result from the introduction of a system. Budget constraints and manpower ceilings make effective management of those requirements imperative. Identifying, monitoring, recording, and coordinating the data connected with force structure requirements is a complex task which requires a thorough understanding of the procedures, techniques, methods, and various management systems used in the requirements process. The SI works in close cooperation and coordination with his or her counterparts at TRADOC and the HQDA Staff.

g. Deputy Chief of Staff for Operations and Plans (DCSOPS).

(1) Until Phase I Implementation Plan and AR 10-5, previously discussed, are developed, the DCSOPS has primary ARSTAF responsibility for the prioritization and validation of both materiel quantitative and performance requirements. DCSOPS develops broad force requirements and issues guidance for the combat developments programs to include establishing materiel objectives and requirements, overall force structure design, fielding schedules, and BOIPs. DCSOPS provides guidance and reviews results of AoAs, establishes priorities for materiel development for designating major Army programs, and is a regular member of the ASARC. Under Phase I, effective 1 December 2000, DCSOPS:

(a) Retains Force Programs Directorate (renamed Force Management Directorate),

(b) Retains requirements validation/approval within DCSOPS,

(c) Remains the prioritizer for the Army,

(d) Retains the Army Modeling and Simulation Office (AMSO) and Joint Doctrine.

(2) Other DCSOPS responsibilities include:

(a) Developing Army policy and guidance for materiel requirements and combat development programs. This includes the requirements determination process, prioritization, resourcing, and integration of materiel warfighting requirements.

(b) Establishing and validating Army priorities throughout PPBES to include RDA programs.

(c) Assigning catalog of approved requirements documents (CARDS) reference number, and maintaining and publishing CARDS.

(d) Providing ARSTAF oversight of the development of the operational architecture (OA) and requirements.

h. Deputy Chief of Staff for Logistics (DCSLOG). The DCSLOG assesses the logistical supportability of materiel systems during the system acquisition process through management of the ILS program. DCSLOG participates in all phases of the RDA management process to ensure equipment is logistically reliable, supportable, and maintainable. DCSLOG is also responsible for secondary item requirements including secondary item war reserve requirements. The DCSLOG is a regular member of the ASARC.

(1) The DA logistics support officer (DALSO) is the HQDA representative of the logistics community, providing logistics coordination. The DALSO monitors the progress of the assigned system and ensures that all elements of ILS, as outlined in AR 700-127, are satisfactorily completed. Because of the interrelationships of assigned responsibilities in materiel acquisition, close and continuous coordination and cooperation is essential between the DALSO and his or her counterparts at TRADOC, AMC, and the HQDA Staff. In addition to new items of equipment, DALSOs also have responsibility for existing weapons and materiel systems in the

Army force structure. This responsibility covers all phases of logistics support to include readiness, redistribution, and disposal.

(2) The DALSO's primary mission is to provide HQDA general staff supervision over the ILS management of assigned commodity materiel/weapons systems from concept to disposal. Other responsibilities include:

(a) Taking ARSTAF responsibility for logistical acceptability and supportability of materiel systems, interoperability, ILS, materiel release, and logistics R&D programs for the Army.

(b) Establishing the HQDA logistic position concerning acceptability, deployability, and supportability for all acquisition programs.

(c) Serving as the logistician in the materiel acquisition process for other than medical equipment, and conduct surveillance over logistics aspects of materiel acquisition and modification programs to ensure supportable systems.

(d) Providing policy guidance for logistics for medical and engineer materiel acquisition.

i. Deputy Chief of Staff for Personnel (DCSPER).

(1) The DCSPER has ARSTAF responsibility for personnel management. DCSPER monitors planning for the manpower and personnel aspects of new systems. Also, the DCSPER is the proponent and has primary ARSTAF responsibility for the DOD Human Systems Integration (HSI) program (called MANPRINT program in the Army). The emphasis of the MANPRINT program is to enhance total system performance (soldier in the loop) and to conserve Army manpower, personnel and training (MPT) resources. The DCSPER is a regular member of the ASARC.

(2) The DA personnel staff officer (PERSSO) is the ARSTAF representative of the personnel community. The PERSSO provides for the continuous coordination necessary to ensure the smooth integration of new equipment, materiel systems, and new organizations. The PERSSO responsibilities include, but are not limited to: preparing and justifying force structure requests in conjunction with the organization integrator (OI) and SI; reviewing and coordinating the development of force structure changes; personnel supportability architecture, officer and enlisted issues related to new organizational concepts and doctrine; and ensuring programming and budgeting of manpower spaces. The PERSSO participates in all HQDA actions to develop the staff position on CBTDEV proposals for potential MDAPs (mission need determination), the designation of a proposed system, the recommendations on the elements of system fielding including the proposed BOIP, the initial issue quantity (IIQ), and the Army Acquisition Objective (AAO). The PERSSO represents the DCSPER at force modernization-related, HQDA-sponsored conferences, forums, and meetings on issues of supportability concerning the introduction of new and/or reorganized existing TOE/TDA units.

j. Deputy Chief of Staff for Intelligence (DCSINT).

(1) The DCSINT provides scientific and technical intelligence and threat projections in support of all aspects of the Army RDA programs.

(2) In addition, a threat integration staff officer (TISO) is designated by the DCSINT to function as the HQDA threat integration coordinator for designated mission areas, programs, and systems. The TISO represents the DCSINT on all aspects of threat support throughout the system life-cycle or study process. The TISO system complements the ODCSOPS SI and is designed to

foster closer coordination among the intelligence community, MACOMs, and ARSTAF agencies to ensure the timely integration of the threat into the materiel acquisition process. The TISO system supplements existing management procedures but does not relieve ARSTAF agencies and MACOMs of established responsibilities. The DCSINT is the approving authority for either establishing or ending TISO monitorship of systems. Generally, all programs designated as Army major or non-major systems will be assigned to a TISO for monitorship on an as-required basis with approval of the DCSINT.

k. The Surgeon General (TSG). TSG has ARSTAF responsibility for medical research, development, test and evaluation, and is the Army medical MATDEV. The TSG is also responsible for the medical aspects of all other development and acquisition programs ensuring mission area interface with CBTDEVs. The TSG serves as a member of the ASARC and ITOIPT for medical issues, including health hazard assessment, personnel safety, and hazards remediation. Other responsibilities include:

(1) Developing policy, responsibilities, and procedures to ensure implementation of systems acquisition policy as it applies to combat medical systems, medical readiness and health care programs, and other assigned Army and joint service requirements.

(2) Assigning support responsibilities for medical materiel development and acquisition to agencies and activities under TSG command and control.

(3) Recommending to TRADOC materiel requirements and associated priorities for medical readiness and health care programs.

(4) Establishing mission area interface with TRADOC for all medical programs, ensuring that requirements and interests of each participating service are provided full consideration in medical programs for which the Army has lead agency or executive agency responsibility.

l. Chief of Engineers (COE). The COE monitors requirements and research and development necessary to provide construction design criteria, construction techniques, and construction material for the Army, Air Force, and other government agencies. The COE provides fixed-facility concealment, camouflage, and deception; real estate management techniques; and engineering support for maintenance of installation and facilities. It is the COE's mission to preserve and improve environmental quality associated with construction and facilities and Army environmental quality and R&D activities covering atmospheric, terrestrial, and topographical sciences. The COE is also responsible, under the general direction of the AAE, for the RDTE of fixed and floating power systems, and high voltage generation applications (to include nuclear applications). The COE reviews all emerging Army systems for digital terrain data requirements and environmental effects such as climate, terrain, or weather. The review also includes minimization of toxic and hazardous wastes and those hazardous wastes associated with normal system test, operation, use, and maintenance.

m. The General Counsel (GC). The GC advises the AAE and the ASARC on any legal issue, which arises during the acquisition of a weapon or materiel system. The GC reviews all Army acquisition policy and supervises all attorneys providing legal advice relating to programs within the Army RDA management system. The GC is also responsible for all legal advice in the negotiation, oversight, and review of international cooperative RDA programs.

11-18. Major Army commands (MACOMs)

a. Military Traffic Management Command (MTMC). MTMC provides transportability engineering advice and analyses to the MATDEV, CBTDEV and TNGDEV; provides item, unit,

and system transportability assessments for MDR; provides transportability approval or identify corrective actions required to obtain approval for all transportability problem items; and reviews all materiel requirements documents to assess adequacy of transportability.

b. U.S. Army Medical Command (MEDCOM). MEDCOM is the medical CBTDEV, TNGDEV, trainer, and user representative. MEDCOM conducts medical combat and training development activities as assigned by CG, TRADOC and TSG; reviews and evaluates materiel and TADSS requirements documents to identify and assure that adequate consideration is given to the prevention of health hazards from operating or maintaining materiel systems, and conduct the health hazard assessment (HHA) program, as required; conducts and supports assigned operational tests; and forwards all medical warfighting concepts and requirements documents to TRADOC for review and approval.

c. U.S. Army Intelligence and Security Command (INSCOM). INSCOM is the CBTDEV for strategic signals intelligence (SIGINT) systems and INSCOM sole-user intelligence, electronic warfare (EW) systems used for formulating doctrine, concepts, organization, materiel requirements, and objectives. INSCOM responsibilities include:

(1) Preparing requirements documents and serving as the Army CBTDEV during development and fielding of new SIGINT and information security (INFOSEC) systems under the purview of the National Security Agency (NSA) and having sole application to U.S. SIGINT and INFOSEC systems. INSCOM forwards warfighting concepts and requirements documents to TRADOC for review and approval.

(2) Coordinating with the PEO or MATDEV on matters pertaining to acquisition of INSCOM sole-user SIGINT and intelligence, security and electronic warfare (ISEW) systems.

(3) Coordinating with the CG, TRADOC, on requirements determination for other INSCOM sole user intelligence, security, and electronic warfare (ISEW) systems and conduct combat and training developments for these Army systems when directed by HQDA, and/or Director, Central Intelligence (DCI), or at the request of CG, TRADOC.

(4) Ensuring documentation of requirements for training support products, system TADSS, and/or embedded training for INSCOM systems.

(5) Providing threat documentation to TRADOC as validated and approved by HQDA DCSINT.

(6) Recommending to CG, TRADOC materiel requirements and associated priorities for strategic intelligence and security readiness.

d. U.S. Army Materiel Command (AMC). AMC performs assigned materiel and related functions for research and development, acquisition and logistics support of materiel systems, and other materiel acquisition management functions required by DA. AMC is a principal MATDEV in the Army. The CG, AMC is a regular member of the ASARC. The AMC mission, in support of RDA, is to:

(1) Equip and sustain a trained, ready Army.

(2) Provide development and acquisition support to MATDEVs (PEOs, DSAs, and PMs).

(3) Provide equipment and services to other nations through the Security Assistance Program.

(4) Develop and acquire non-major systems and equipment.

(5) Define, develop, and acquire superior technologies.

(6) Maintain the mobilization capabilities necessary to support the Army in emergencies.

(7) Verify system safety; support developmental operational tests; and participate in the continuous evaluation process.

(8) Exercise delegated authority, under ASA(ALT) oversight, in the following areas: metrication; design to cost; production readiness reviews; manufacturing technology, standardization; acquisition streamlining; reliability, availability, and maintainability; quality; risk management; value engineering; parts control; and industrial modernization improvement.

(9) Provide survivability, vulnerability, or lethality assessments and survivability enhancement expertise for all Army materiel programs.

(10) Evaluate and recommend improvements to the industrial base.

(11) Responsible for the RDA and logistics support of assigned materiel in response to approved materiel requirements.

(12) Plan, coordinate, and provide functional support to PEOs, DSAs, and PMs. Support includes, but is not limited to, procurement and contracting, legal, managerial accounting, cost estimating, systems engineering, conducting system TADSS and embedded training concept formulation, developmental test, logistics support analyses, MANPRINT, environmental, intelligence and threat support, configuration management, and conducting various independent assessments and analyses.

(13) Provide overall management of the Army's technology base (less Class VIII), including identification of maturing technologies necessary to support acquisition of warfighting materiel systems.

(14) Provide RDA science and infrastructure information to HQDA for the Army RDA plan.

(15) Conduct a crosswalk, with the CBTDEV (TNGDEV for TADSS), of the ORD to the RFP to verify that the RFP, to include system specification or purchase description and the SOW, accurately reflects the operational requirements stated in the ORD for all programs. The MATDEV and CBTDEV (MATDEV and TNGDEV for TADSS) will formally certify that the RFP has been crosswalked with the ORD and is in agreement prior to the ASARC or program review.

(16) Provide initial and updated cost and system performance estimates for battlefield and peacetime operations as inputs to supporting analysis and program decisions.

e. U.S. Army Training and Doctrine Command (TRADOC). TRADOC is the Army's primary "user representative" in the materiel acquisition process. TRADOC performs assigned materiel and related functions for operations research and analysis, evaluation of products of the requirements determination process, operational and organizational planning, logistics support planning, and quantitative and performance requirement specifications for materiel systems, and other combat development functions required by DA. As the Army's principal CBTDEV, TRADOC guides, coordinates, and integrates the total combat development effort of the Army. Combat developments are a major component of force development and encompass the formulation of concepts, doctrine, organization, materiel objectives, requirements, and operational tests (OT) of products of the requirements determination process.

(1) The CG, TRADOC is a regular member of the ASARC. As the Army's primary CBTDEV/TNGDEV, TRADOC is the Army's architect for the future and is charged to chart the course for the Army. In doing this, CG, TRADOC:

(a) Guides and disciplines the requirements determination process by:

- Providing requirements determination and documentation procedures and process guidance.
- Establishing and implementing horizontal requirements integration (HRI) policy.
- Generating all Army warfighting requirements prior to their submission to HQDA.
- Approving integrated concept team (ICT) minutes or reports containing proposing solution sets for force level objective force capabilities (OFCs) and proponent/branch level future operational capabilities (FOCs).
- Coordinating MNSs and ORDs produced by the Army community and forward to DCSOPS for approval, prioritization and resourcing.

(b) Assists DA to prioritize and justify warfighting requirements by:

- Determining applicability of ONS to future Army-wide requirements and assign to a proponent for requirement documentation.
- Providing insights and descriptive information for materiel programs.
- Supporting ODCSOPS by presenting documents and information to the JROC and Joint Warfighting Capabilities assessment (JWCA) and assisting in issue resolution.
- (c) Coordinates and integrates the total combat/training developments efforts of the Army by:
- Providing, with appropriate support from other MACOMs, the capstone warfighting concept and OFCs/FOCs, the start point for requirements determination process.
- Developing and maintaining the C4I operational architecture (OA).
- Being the primary source for determining need for and preparing requirements and requirements documents for TADSS and embedded training.
- Determining need for and obtaining CSA approval for conduct of advanced warfighting experiments (AWEs).

(d) Conducts AoA for ACAT I, IA, and most II, programs when required by HQDA. When required by the MDA, conduct AoA for all other ACAT programs.

(e) Serves as member of the Army S&T Advisory Group (ASTAG).

(f) Provides representative to Army S&T reviews and management teams.

(2) TRADOC is organized into integrating centers and mission area schools and centers. The principal integrating centers in the materiel acquisition process are the Combined Arms Center (CAC), Fort Leavenworth, and the Combined Arms Support Command (CASCOM), Fort Lee. The mission area schools and centers are the branch schools and centers for Infantry, Armor, Field Artillery, Air Defense Artillery, Aviation, etc. The directorates of combat developments (DCDs) at the TRADOC mission area school and centers work very closely with the PEO community and the AMC "commodity" MSCs in the RDA management process.

(3) The TRADOC counterpart to the PM, the TRADOC system manager (TSM), is a central Figure in the RDA process and a key member of the MATDEV/CBTDEV team. The TSM is chartered by the CG, TRADOC to function as focal point for coordination of the CBTDEV/TNGDEV efforts in the development and acquisition of the system. The TSM is responsible to synchronize all doctrine, training, leader development, organization and soldier (DTLOS) domains that are impacted by the fielding of a materiel system. TSMs are appointed for selected acquisition programs. In some cases, a TRADOC program integration office (TPIO) may be appointed for a family of systems such as Army Battle Command System (ABCS), Combat ID, etc. A TSM/TPIO is appointed early in the development cycle, normally at the same time as the PM. The TSM is usually located at the proponent school and center. For systems without an assigned TSM/TPIO, the DCD at the proponent school and center serves as the focal point.

f. U.S. Army Special Operations Command (USASOC). In support of materiel systems RDA management, USASOC establishes mission area interface with TRADOC for all programs, ensuring that requirements and interests of each participating agency are provided full consideration in programs for which the Army has lead agency or executive responsibility, and serves as the special operations trainer and user representative. In addition, USASOC will:

(1) Forward all non-SOC unique warfighting capability requirements and documents to CG, TRADOC for appropriate action.

(2) Forward SOC unique requirements documents to CG, TRADOC for review.

(3) Monitor TRADOC projects and identify needs that affect the USASOC mission and responsibility.

(4) Support TRADOC field activities, conduct and support testing, and monitor RDA projects to include potential force standardization and interoperability.

(5) Participate in warfighting experiments, as appropriate.

g. U.S. Army Space and Missile Defense Command (USASMDC). USASMDC is the principal assistant and advisor to the SA and the CSA for all matters pertaining to space and strategic defense. The USASMDC is responsible for technology development programs related to strategic and tactical missile defense, space defense, and satellite technology. The command conducts missile defense technology base research and development activities in support of the Ballistic Missile Defense Organization (BMDO), assures transfer of technology between BMDO and Army systems, and provides matrix support to PEO Missile Defense. USASMDC is also chartered by CSA to be the operational advocate and focal point for theater missile defense (TMD) at Army level. The CG, USASMDC, assists in the development of Army TMD positions, reflective of work being done in TRADOC, and represents those positions at HQDA, OSD, BMDO, Joint Staff, Congressional, and other high-level forums.

11-19. Other DA agencies

a. U.S. Army Test and Evaluation Command (ATEC). ATEC is a field operating agency (FOA) under the CSA. The CG, ATEC is responsible for management of the Army's operational testing, developmental testing, and system evaluation. Their evaluations of materiel systems operational effectiveness, suitability and survivability are independent of the CBTDEV/MATDEV and are reported directly to the MDR body. CG, ATEC is a member of the ASARC and Chairman of the Test Schedule and Review Committee (TSARC). The TSARC is the HQDA centralized management forum for user (operational) testing resources. ATEC

provides advice and assistance to the CSA, the VCSA, other members of the ARSTAF, and other elements of DA in regard to Army operational test and evaluation. Other responsibilities are to:

(1) Review all draft materiel requirements documents for T&E implications.

(2) Assist TRADOC (CBTDEV/TNGDEV) in developing evaluatable, operationally relevant, and totally system focused critical operational issues and criteria (COICs). Provide advice concerning methods and measures to evaluate the system against the COIC and advise on the resources and ability to test and evaluate the system.

(3) Support the TRADOC advanced warfighting experiment (AWE) program and concept experimentation program (CEP).

b. U.S. Army Medical Research and Materiel Command (USAMRMC). USAMRMC is the medical MATDEV, logistician, and developmental tester and is responsible for RDA and logistic support of assigned materiel in response to approved materiel requirements. In addition, USAMRMC will:

(1) Plan, program, budget, and execute medical RDTE tasks that support system RDA to include required system training support products, TADSS, and/or embedded training.

(2) Plan, coordinate, and provide functional support to USAMRMC organizations. Support includes, but is not limited to, procurement and contracting, legal, managerial accounting, cost estimating, systems engineering, conducting system TADSS and embedded training concept formulation, developmental testing, ILS, MANPRINT, environmental management, configuration management, and conducting various independent assessments and analyses.

(3) Assist the medical CBTDEV/TNGDEV in the requirement determination process.

(4) Review requirement documents to determine their adequacy and feasibility and for logistical support aspects of materiel systems to include ILS.

(5) Develop and maintain the physiological, psychological, and medical databases to support the HHA, system safety assessments (SSA), and human factors engineering analysis (HFEA).

(6) Evaluate and manage the materiel readiness functions in the medical materiel acquisition process.

(7) Function as TSG agency for the materiel acquisition of medical nondevelopmental items (NDI), commercial off-the-shelf (COTS) items, and sets, kits, and outfits.

c. U.S. Army Medical Department Center and School (AMEDDC&S). AMEDDC&S is the medical CBTDEV, TNGDEV, doctrine developer, and operational tester. In addition, AMEDDC&S develops doctrine, organizations, and systems requirements within the guidelines established by the CG, TRADOC and in accordance with Army health care standards established by TSG.

SECTION IV
MATERIEL REQUIREMENTS DETERMINATION PROCESS.

11-20. Policy

a. DODD 5000.1 and DODI 5000.2 provide mandatory DOD acquisition policy and procedures including materiel requirements documentation and approval guidance for MDAPs

for both materiel and AIS. Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01A mandates policy and procedural guidance for the requirements generation system to include guidance on KPPs, measures of effectiveness (MOEs), and the JROC. AR 70-1 provides Army acquisition guidance for materiel and information systems. AR 71-9 provides Army requirements determination and documentation policies and responsibilities implementing DODD 5000.1, DODI 5000.2 and CJCSI 3170.01A supporting all Army ACAT I through IV materiel and information systems. ACATs are shown in Figure 11-4. The terms materiel and materiel system in this chapter apply to materiel and information systems unless specifically identified otherwise.

b. The main governing policies are summarized below:

(1) The requirements determination process provides a current and future Army capable of success in any contingency from humanitarian assistance to full tactical operations in joint and combined environments. The process will be responsive to the urgent materiel requirements of the deployed warfighter as well as project the full set of doctrine, training, leader development, organizational design, materiel, and soldier (DTLOMS) requirements for the Army to be mission capable in near-, mid-, and far-term operations.

(2) Field commanders document and submit their urgent warfighting and training operational requirements and obtain support via the ONS process discussed in AR 71-9, TRADOC Black Book #3 and TRADOC Pamphlet 71-9.

(3) Commanders with combat developments missions conduct continuing analyses identify and define near- through far-term DTLOMS requirements.

(4) Future operational requirements for all DTLOMS domains will be related to the TRADOC approved capstone operational concept and associated lower level supporting and integrating concepts (TRADOC Pamphlet 525-5). The current approved capstone warfighting concept for the Army is Army Transformation (Objective Force). Requirements not related to these warfighting concepts are not provided resources. TRADOC's integrated and approved listing of force level OFCs and proponent/branch level FOCs from these concepts serve as a process control mechanism; authority for supporting studies and experimentation; and a device for linkage between requirements documentation and the concepts. OFCs and FOCs are listed biannually in TRADOC Pamphlet 525-66.

(5) Requirements determination is the work of ICTs, made up of people from multiple disciplines. Their efforts may include concept development or materiel operational requirements development and documentation. DTLOMS solution sets are documented in ICT minutes or reports. ICTs operate on principals similar to acquisition integrated product teams (IPTs) in DODI 5000.2 to identify and resolve issues early. An ICT includes representatives of Army requirements process stakeholders and other principal contributors, including academia and industry, when appropriate. OSD, other services, CINCs, and Joint Staff are invited to send representatives, as appropriate, when their interest is known or suspected.

(6) A materiel requirement is developed for an approved OFC/FOC only after all other possible doctrine, training, leader development, or organizational solutions are deemed unable to solve the OFC/FOC. The priority order of consideration is doctrine, training, leader development, organizational design, and finally materiel. MNSs are prepared in accordance with CJCSI 3170.01A format guidelines for those materiel requirements with ACAT I or IA program potential and other programs representing a new Army mission or a potential program using a significant leap ahead technology. ORDs are prepared in accordance with DODI 5000.2 format guidance.

(7) All ACAT I, IA, II, and III materiel programs have an ORD. ACAT IV materiel programs have ORDs, except ACAT IV base operations materiel that are not warfighting requirements. They can be procured following MACOM standard acquisition procedures.

(8) The Joint Staff, J-6, will conduct an interoperability requirements certification of all ACAT I, IA, II, and III MNSs, CRDs, and ORDs (CJCSI 6212.01B).

(9) All IT products must comply with the Army's operations, systems, and technical architectures. MACOM information management offices review and ensure compliance with architectures.

(10) Standardization is a key focus of CBTDEVs/TNGDEVs throughout the requirements determination and acquisition management process. Properly applied, standardization can significantly reduce life-cycle costs, schedules, and risks, while improving quality and logistic support.

(11) Close coordination is maintained between CBTDEVs/TNGDEVs and the S&T community to ensure that technology investments are appropriately focusing on identified OFCs/FOCs. Periodic reviews are conducted with program offices, laboratories, users, and maintainers to assess the technical status, emerging performance, affordability, and remaining technology shortfalls. Modeling and simulation (M&S) are used to preclude unnecessary and impractical development.

(12) All system developments have many capability characteristics that are defined in requirements documentation. key performance parameters (KPP) are those system characteristics that define whether or not a system will be capable of mission accomplishment. KPPs are, by definition, characteristics that can cause a concept or system to be reevaluated and a program to be reassessed for restructuring or termination. All requirements documentation will contain KPPs, which will in turn be documented in the system APB. A KPP addressing interoperability is required (CJCSI 3170.01A). For ACAT I systems, KPPs are validated and approved by the JROC even if the authority for the requirements document has been delegated to the component. HQDA validates and approves other KPPs.

(13) When developing system characteristics and performance parameters, cost must be considered on an equal level. In other words, cost is treated as an independent variable along with others used to define a system. This concept - CAIV - does not preclude consideration and evaluation of a new high potential, leap-ahead but expensive DTLOMS technology.

11-21. Army science and technology

a. The ultimate goal of the Army's S&T program is to provide the soldier with a winning edge on the battlefield. The accelerating pace of technological change continues to offer significant opportunities to enhance the survivability, lethality, deployability, and versatility of Army forces. High technology research and development is, and will remain, a central feature of the Army's modernization strategy. Key to this modernization strategy is the planned transition of promising technology developments into tomorrow's operational capabilities. Technology demonstrations (TDs), discussed later, which evolve into systems and system upgrades incorporated in the AMP accomplish this transition.

b. The Army's S&T program is an integral part of materiel acquisition. The S&T program consists of three stages - basic research (6.1), applied research (6.2), and advanced technology development (6.3). The identifiers--6.1, 6.2, etc.--are commonly used for identifying funds; but they are also used as a shorthand technique by members of the R&D community to identify levels of research development. For example, instead of referring to some project as being "in

applied research," it is often referred to as being "6.2". The 6.1, 6.2, and 6.3 categories are known as the "tech base". (A MNS is not required for 6.1, 6.2 programs, regardless of size.). Basic research (6.1) includes all efforts of scientific study and experimentation directed toward increasing knowledge and understanding in those fields related to long-term national security needs. Applied research (6.2) includes all efforts directed to the solution of specific military problems, short of major development projects. Advanced technology development (6.3) includes all efforts directed toward projects, which have moved into the development of hardware for testing of operational feasibility. Initiatives, such as the DOD advanced concept technology demonstrations (ACTD), (discussed later in the chapter) obscure the distinction between S&T and development -- pre-and post-milestone A activities.

c. The Army Science and Technology Master Plan (ASTMP) is the strategic plan for the Army's S&T program. It is approved by the SA and the CSA. It is our S&T roadmap for achieving Army Transformation and Force XXI. This plan is provided to government, industry, and academia to convey the Army's S&T vision, objectives, priorities, and corresponding strategy. This document is explicit, resource-constrained DA guidance to drive funding priorities and the S&T program as a whole. The ASTMP provides "top down" guidance from HQDA to all S&T organizations. It also provides a vital link between DOD technology planning and the Army's major commands and laboratories. The core of DOD's S&T strategy is to fuel and exploit the information technology explosion; conduct extensive and realistic demonstrations of new technology applications; and provide for early, extensive and continued involvement of warfighters in S&T demonstration programs. S&T programs must be responsive to numerous national security considerations.

d. A mainstay of the Army strategy for military technology is a viable in-house research capability. Laboratories and research, development, engineering centers (RDECs) are the key organizations responsible for technical leadership, scientific advancements and support for the acquisition process. Activities of these organizations range from basic research to the correction of deficiencies in field systems. Academia and industry as well as hands-on bench work contribute to the S&T mission. Technology insertion into systems is accomplished via the flow of patents, data, design criteria, and other information into TDs, ATDs, new designs, and fielded systems.

e. The Army is streamlining the in-house research infrastructure through laboratory consolidation and placing significantly greater reliance on other Services S&T investments. In an effort to make the Army's 21st century research and development efforts more efficient and effective the Lab 21 study was initiated. One of the key elements of Lab 21 was the creation of a world class "flagship" laboratory called the Army Research Laboratory (ARL). Independent Army laboratories have been consolidated into technical directorates under the ARL management umbrella. ARL converted to a federated laboratory system, aligning Army researchers with the best that industry and academia have to offer to support Army Transformation and Force XXI.

f. Overall, the Army's S&T strategy and programs are committed to the maintenance of technological superiority, while preserving the flexibility to cope with a wide array of possible threat, technology, and budget environments. The Army's investment in S&T is paramount and is playing a greater role in acquisition than ever, particularly since the advent of DOD ACTDs.

g. A series of reviews of current and proposed S&T activities guide focused research. The first is an annual assessment of all proposed Army-funded S&T projects. It is conducted based on an appreciation of current capabilities, ongoing S&T activities and their applicability to the OFCs/FOCs described earlier in the chapter in TRADOC Pamphlet 525-66. Building from the

S&T project review, a list of the top 200 Army science and technology objectives (STO) candidates--the Army's most important S&T projects--is generated. Based on formal developmental milestones and achievement measures, the Army Science and Technology Working Group (ASTWG) approves each STO, which is then listed in ASTMP. The ASTMP and the AMP provide the basis for ATDs, which showcase a variety of advanced technologies and their potential military merit. In addition to advancing the technology, all of this in-house S&T activity assists the ICTs to better understand the "art of the possible" and refine the many requirements associated with them.

h. TRADOC Pamphlet 525-66 also guides independent research & development (IR&D) efforts. By providing the private sector an unclassified, descriptive list of desired OFCs/FOCs, the Army is able to tap into a wealth of information and new ideas on different means to achieve those capabilities. The Army encourages industry to share these ideas with appropriate CBTDEV and TNGDEV organizations.

i. A special program—Advanced Concept and Technology II (ACT II) program—encourages the application/demonstration of mature technologies, NDI, and/or prototypes to address highest priority OFCs/FOC needs. ACT II funds proposed TDs which, if successful and compelling, may be selected for expedited acquisition or funded through the normal Army acquisition process. ACT II projects are funded at a maximum of $1.5 million with a planned period of performance not exceeding twelve months. The program is focused on applying mature technologies and unconventional concepts and approaches to address specific OFCs/FOCs which are solicited annually through a broad agency announcement (BAA). This approach shortens the acquisition cycle and reduces developmental costs. ACT II is sponsored by the CSA and ASA(ALT). TRADOC, AMC, and the Army Research Office (ARO) collaborate to build ACT II partnerships between the Army, industry, and the academic community.

j. As with some concepts, S&T research occasionally produces an item that is recognizable as a defined requirement that should be documented and resourced. Most S&T products must be evaluated in warfighting experiments before a decision is made to document them as materiel requirements.

k. Oversight of the S&T program is provided by the ASTAG, which is co-chaired by the AAE and the VCSA (Figure 11-6). The ASTWG, is co-chaired by the Army S&T executive (the Deputy Assistant Secretary for Research and Technology) and the ADCSPRO-FD. The ASTWG provides general officer level resolution of pressing S&T issues prior to meetings of the ASTAG; recommends to the ASTAG revisions to the Army's S&T vision, strategy, principles, and priorities; and reviews and approves ATDs and STOs.

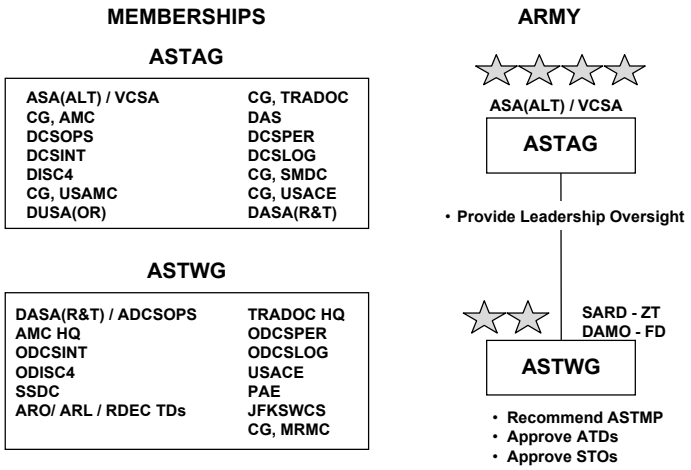


Figure 11-6. Army Science and Technology Oversight

11-22. Technology transition strategy

The basic strategy of the S&T program is to transition mature technologies into operational systems that satisfy approved warfighting materiel requirements. Key to this strategy are demonstrations. TDs, ATDs, ACTDs exploit technologies derived from applied research (6.2), which in turn build on new knowledge derived from basic research (6.1) programs. These TDs, ATDs, and ACTDs provide the basis for new systems, system upgrades, or advance concepts which are further out in time. The critical challenge is to tie these programs together in an efficient and effective way. TDs are not new. What is new is the scope and depth of the technology demonstrations, the increased importance of their role in the acquisition process, and the increased emphasis on user involvement to permit an early and meaningful evaluation of overall military capability. The following sections provide an explanation of TDs, ATDs, ACTDs, as well as systems/system upgrades.

a. Technology demonstrations (TDs). The primary focus of TDs is to demonstrate the feasibility and practicality of a technology for solving specific military requirements. They are incorporated during the various stages of the 6.2 and 6.3 development process and encourage technical competition. They are most often conducted in a non-operational (lab or field) environment. These demonstrations provide information that reduces uncertainties and subsequent engineering cost, while simultaneously providing valuable development and requirements data.

b. Advanced technology demonstrations (ATDs). Within the DTAP, previously discussed, specific ATDs are structured to meet established goals. Detailed roadmaps to guide their progress are developed, as well as exit criteria to define their goals. ATDs are risk reducing, integrated, "proof of principle" demonstrations designed to assist near-term system developments in satisfying specific operational capability needs. The ATD approach has been promoted by the Defense Science Board (DSB) and the Army Science Board (ASB) as a means of accelerating the introduction of new technologies into operational systems. They are principally funded with advanced technology development (6.3) funds. ATDs facilitate the integration of proposed technologies into full system integration (6.4) or system demonstration (6.5) prototype systems. As such, they provide the link between the technology developer, PEO, PM, and the Army user. As of this update, the Army has 20 ATDs which have been approved by the ASTWG. More detailed information including exit criteria for each ATD can be found in the ASTMP previously discussed. The criteria for establishing an ATD are:

(1) Execution at the system or major subsystem level in an operational rather than a laboratory environment.

(2) Potential for new or enhanced military operational capability or cost effectiveness.

(3) Duration of three to five years.

(4) Transition plan in place for known and/or potential applications.

(5) Active participation by TRADOC battle lab and user proponents.

(6) Participation by the MATDEV (PM).

(7) Use of simulation to assess doctrine/tactical payoffs.

(8) Exit criteria established with user interaction/concurrence.

c. Advanced concept technology demonstrations (ACTDs). The newest initiative in the DOD acquisition strategy is the ACTD. The DOD ACTD initiative, grew from the 1986 Packard Commission recommendation for rapid prototyping. ACTDs are joint Service in nature, featuring CINC sponsorship and provide as much as two years of leave-behind (residual) capability in the field. ACTDs apply advanced technologies to joint warfighting requirements to provide an advanced capability in limited time frames. The ACTD is an integrated effort to assemble and demonstrate a significant new military capability, based upon maturing advanced technology(s), in a real-time operation at a scale adequate to clearly establish operational utility and system integrity. ACTDs are jointly sponsored and implemented by the operational user, and MATDEV communities, with approval and oversight guidance from the Deputy Under Secretary of Defense (Advanced Systems and Concepts) (DUSD(AS&C)).

(1) The ACTD concept is a cornerstone in the new acquisition strategy that relies on prototyping and demonstration programs to maintain the U.S. military technological edge in the face of declining procurement budgets. ACTDs are a maturer phase of the ATDs. They are two- to four-year efforts in which new weapons and technologies are developed, prototyped, and then tested by the soldiers in the field for up to two years before being procured.

(2) ACTDs are not new programs, but tend to be a combination of previously identified ATDs, TDs, or concepts already begun. They include high level management and oversight to transform disparate technology development efforts conducted by the various military services into prototype systems that can be tested and eventually fielded. The ACTD becomes the last step in determining whether the military needs and can afford the new technology.

d. Systems and system upgrades.

(1) The development of the next set of materiel systems requires prior demonstration of the feasibility of employing new technologies. “New-start” systems are those next in line after the ones currently fielded or in production. For these systems, most technical barriers to the new capability have been overcome. Generally, these systems can enter system development and demonstration (acquisition system management process phase B) relatively quickly as a result of the successful demonstration of enabling technologies. Based on current funding guidance, the number of “new-start” systems is in a sharp decline.

(2) In the absence of “new-start” systems, the Army is pursuing incremental improvements to existing systems to maintain its technological edge, and capabilities. As defined in the ASTMP, these improvements are designated as systems modifications. System modifications are brought about through technology insertion programs (discussed in detail later), service life extension programs (SLEPs), preplanned product improvements (P3I), and

block improvement programs. These modifications are based primarily on the success of funded 6.3 ATDs/TDs. The 6.3 ATDs/TDs either are the basis for the system modification or have a high probability of forming the basis for the system modification.

11-23. Warfighting experiments

Warfighting experiments are the heart of DOD/Army's warfighting requirements determination process. Progressive and iterative mixes of high fidelity constructive, virtual and live simulations using real soldiers and units in relevant, tactically competitive scenarios provide Army leaders with OFC/FOC insights. Warfighting experiments are conducted to gain understanding about some aspect of future warfighting. Capability insights from warfighting experiments are "way points" used by the Army to plot its future course to Army Transformation and Force XXI. There are four main categories of warfighting experiments -- concept experiments, limited objective experiments (LOEs), AWEs, and joint warfighting experiments (JWEs).

a. Concept experiments. The overwhelming majority of warfighting experiments is concept experiments pertaining to TRADOC individual operations or branches. Most concept experiments are conducted as part of the TRADOC CEP. CEP is a separately funded TRADOC initiative that provides quick reaction assessments of the military utility/potential for new or revised DTLOMS concepts. They are a means to "model-experiment-model" possible requirements and are the building blocks in the "progressive and interactive mix" of simulations. Additionally, they are usually small enough to support the detailed planning and data collection required by the test and evaluation communities. A concept proponent conducts the experiment or requests a battle lab to sponsor it. They either resource it in in-house or request resources from HQ, TRADOC.

b. Limited objective experiments (LOEs). LOEs are designed around single events or progressive, iterative simulations with primary relevance to a single issue. LOEs allow the proponent and battle laboratory to conduct low-cost, quick analysis of an issue or to a limited set of issues. LOEs are normally sponsored by one battle laboratory, but there may be several battle laboratories participating in the planning and execution phases of an experiment. LOEs are funded by sources other than the CEP (i.e., within the experimentation campaign plan, school discretionary funds, or by funding from another government agency).

c. Advanced warfighting experiments (AWEs). AWEs are the Army's capstone experimentation events focused on a major increase in warfighting capability across multiple branches and the full DTLOMS spectrum. Any concept proponent recommends the AWE, the TRADOC Commander sponsors it, and the CSA approves and resources it. Today, most AWEs employ live simulations--soldiers and units in field environments. However, live simulations are very expensive, and if they involve new materiel, may occur late in the materiel development cycle. Future warfighting experiments will use a comprehensive suite of reconfigurable simulators and simulations in addition to live simulations. Distributed interactive simulations (DIS) connected by the Defense Simulations Internet (DSI) will create a synthetic theater of war (STOW) that enables Army leaders to quickly model, evaluate and change different requirements from any of the DTLOMS domains. Thus, future warfighting experiments will leverage relatively low-cost models to explore requirements across the DTLOMS spectrum, reserving expensive field exercises for the final defining event in the requirements determination process.

d. Joint warfighting experiments (JWEs). JWEs are a mechanism for experimenting with systems or systems involving advanced technologies prior to commitment to acquisition programs. They are conducted as part of JWEs. A JWE is a snapshot in time when prototypes from ATDs, ACTDs, development programs and technology base efforts are integrated to permit

the warfighter to evaluate their combined potential and gain insight into future advanced joint warfighting concepts. JWEs are DOD-wide efforts to support the horizontal integration and synchronization of advanced technologies from ACTDs, ATDs, and advanced distributed simulation products for experimentation in joint warfighting exercises, such as the September 2000 Millenium Challenge 2000 joint warfighting experiment sponsored by the Commander in Chief, U.S. Joint Forces Command (CINC, USJFCOM). Warfighting experiments provide an unsurpassed means to understand future warfighting requirements. Planned and executed with the entire combined arms team and appropriate other Service elements, warfighting experiments open the "windows to the future". Understanding the cost and benefits of change across the force and in all domains allows us to "maintain the edge" and conserve resources at the same time.

SECTION V
MATERIEL SYSTEMS ACQUISITION MANAGEMENT PROCESS

11-24. Initiation of the materiel acquisition process

The materiel acquisition (RDA) process is initiated as a result of output--approved warfighting materiel requirements--from the requirements determination process efforts of the CBTDEV. Identified materiel requirements are first assessed to determine if they can be satisfied by nonmateriel solutions. Nonmateriel solutions include changes in doctrine, training, leader development, organization, and soldiers (DTLOS). Only if these nonmateriel solutions will not satisfactorily overcome the deficiency is a new development materiel program initiated. A hierarchy of potential materiel alternatives (strategies) must be considered before committing to a new start acquisition program. In order of preference, the DOD directed materiel alternatives are the following:

- Procurement of (including modification of) commercially available domestic or international technologies, systems or equipment, or the additional production (including modification) of previously-developed U.S. military systems or equipment, or Allied systems or equipment.
- A cooperative development program with one or more allied nations.
- A new joint component or government agency development program.
- A new component -unique development program.

11-25. Framework of the materiel acquisition process

In the broad sense, the acquisition process consists of a series of management decisions made in DOD or the Army as the development of a materiel system progresses from a stated materiel requirement to a fielded system. Product improvements (PIs) to existing systems or acquisition of NDI usually occurs through acquisition streamlining (discussed later in the chapter). The framework that is used in the materiel acquisition process is shown in Figure 11-7. A key aspect of the materiel acquisition process is that it is divided into three distinct activities (pre-systems acquisition, systems acquisition, sustainment); four phases (concept and technology development, system development and demonstration, production and deployment, and sustainment); and eight work efforts (concept exploration, component advanced development, system integration, system demonstration, low rate initial production (LRIP), full rate production (FRP) and deployment, operational support, and disposal). Entry into the acquisition process is at one of the decision points, called milestones (MS) or within phases dependent on the technological maturity of the alternative selected.

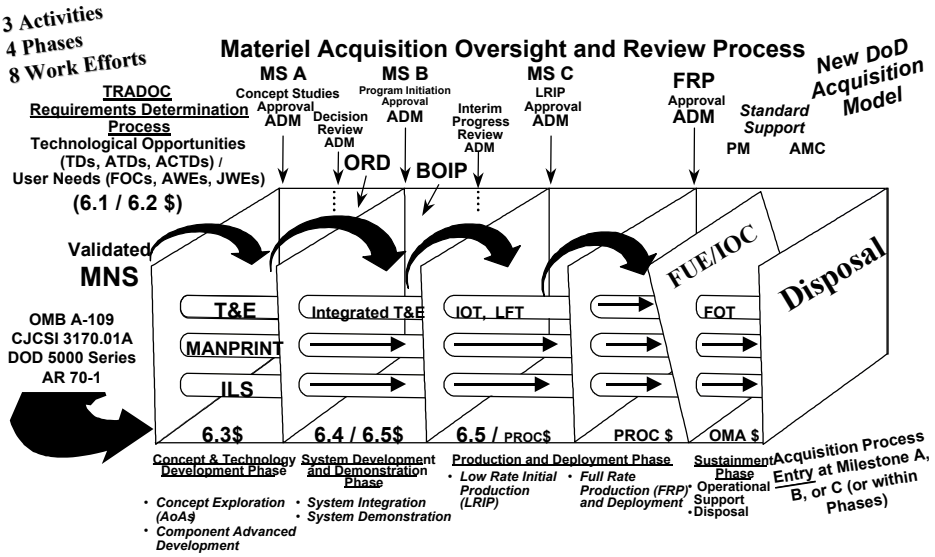


Figure 11-7. System Acquisition Management Process

11-26. Determining and documenting materiel requirements

All acquisition programs are based on identified future operational materiel needs. Determination of these needs is a result of continuing assessments of current and projected capabilities in the context of military threat and national military policy. A mission need may address: (1) a new operational capability, (2) improvement of an existing capability, or (3) a desire to exploit promising technologies. Mission needs can be identified by Unified Commands, the Military Departments, OSD, or the Joint Staff. In theory, mission need identification should first exhaust all nonmateriel solutions such as, doctrine, training, or organizational changes. When a need is identified that could potentially result in the establishment of a MDAP, a MNS is prepared that is a nonsystem-specific statement of operational capability. The MNS can be prepared by any DOD component which has identified a specific mission area materiel requirement or need.

11-27. Acquisition categories

When the materiel requirement and manner of acquisition have been identified, the acquisition is designated as ACAT I-IV. This category determines the level of review, and who will make the milestone decisions. Dollar criteria and visibility of the potential program determine the ACAT. There are four acquisition categories, as shown in Figure 11-4.

11-28. Acquisition strategies and program plans

a. An acquisition strategy is the framework for planning, directing, and managing an acquisition program to satisfy an approved materiel requirement. Acquisition strategies and their supporting program plans are tailored to accomplish established program objectives and to control risk. They must also provide the information essential for milestone decisions. In this regard, acquisition strategies are event-driven and explicitly link major contractual commitments and milestone decisions to demonstrated accomplishments in development and testing.

b. Program plans provide for a systems engineering approach to the simultaneous design of the product and its associated manufacturing, test, and support processes. This concurrent engineering approach is essential to achieving a careful balance among system design requirements (for example, operational performance, producibility, reliability, maintainability, logistics and human factors engineering, safety, survivability, interoperability, and

standardization). Maximum practicable use is made of commercial and other nondevelopmental items. The Army's first preference is to use performance specifications, the next is to use non-government standards (NGS), and as a last resort military specifications and standards (MILSPEC/STD) may be used. Use of MILSPEC/STD requires a waiver from the MDA. Additionally, changes to DODI 5000.2 resulting from the *Federal Acquisition Streamlining Act (FASTA) of 1994* state the AS should be tailored to the extent feasible to employ commercial practices when purchasing commercial products or other nondevelopmental items.

c. Cost as an independent variable (CAIV) is the DOD cost reduction methodology utilized throughout the entire life-cycle of a programs acquisition process to ensure operational capability of the total force is maximized for the given modernization investment. In other words, cost is treated as an independent variable along with others used to define a system. Cost performance analysis is conducted on a continuous basis throughout the life-cycle. CAIV directly impacts the preparation of a program's requirements documents (MNSs, CRDs and ORDs), as well as acquisition documents (AS and APB).

11-29. Environmental considerations

Environmental impact is always considered in Defense acquisitions. The *National Environmental Policy Act (NEPA) of 1969* mandates documentation of the environmental effects of proposed Federal actions. The Act requires initiation of NEPA compliance before development begins; environmental analysis for each milestone decision; accounting for all direct, indirect, and cumulative environmental impacts before production starts, and analysis of life-cycle environmental costs. The environmental documentation process can be lengthy and costly. Early consideration of environmental impacts and NEPA requirements will protect not only the environment, but cost and schedule as well.

11-30. Risk assessments and management

Program risks and risk management plans are explicitly assessed at each milestone decision point prior to granting approval to proceed into the next acquisition phase. Risks must be well understood, and risk management approaches developed, before MDAs can authorize a program to proceed into the next phase of the acquisition process. To assess and manage risk, MATDEVs use a variety of techniques. They include TDs, prototyping, and T&E. Risk management encompasses identification, mitigation, and continuous tracking and control procedures that feed back through the program assessment process to decision authorities. PMs, and other MATDEVs develop a contracting approach appropriate to the type system being developed and acquired.

SECTION VI
ACQUISITION ACTIVITIES, PHASES AND MILESTONES

11-31. Pre-systems acquisition activity

Pre-system acquisition is composed of on-going activities in development of user needs, in science and technology, and in concept development work specific to the development of a materiel solution to an identified, validated materiel requirement.

11-32. Concept and technology development phase

One path into systems acquisition begins with examining alternative concepts to meet a stated mission need. This path begins with a decision to enter Concept and Technology Development at Milestone A. The phase ends with a selection of a system architecture(s) and the completion of entrance criteria into Milestone B and System Development and Demonstration Phase.

11-33. Entrance criteria

a. The Chief of Staff, Army, will approve all warfighting requirements. All Army warfighting requirements in the form of Mission Need Statements (MNS), Capstone Requirements Documents (CRD), and Operational Requirements Documents (ORD) will be submitted to HQDA for validation or approval. This applies to all requirement documents, regardless of Acquisition Category (ACAT) level. In this context, Army warfighting requirements include Joint and other Service requirements with Army participation or interest. The Army Requirements Oversight Council (AROC) is established to advise the Chief of Staff on Army warfighting requirements.

b. After HQDA validates and approves a MNS, the MDA (through the ICT process) reviews the MNS, considers possible technology issues (i.e., technologies demonstrated in ATDs), and identifies possible alternatives before making a Milestone A decision, based on an analysis of multiple concepts (alternatives) to be studied, and considering cooperative opportunities.

11-34. Milestone A

At Milestone A, the MDA approves the initiation of concept studies, designates a lead agency, approves concept exploration exit criteria, and issues the acquisition decision memorandum (ADM). The leader of the CBTDEV–led ICT, working with the integrated test team, develops an integrated evaluation strategy that describes how the capabilities in the MNS will be evaluated once the system is developed. For potential MDAPs, the integrated evaluation strategy is approved by the DOD Director, Operational Test and Evaluation (DOT&E) and the cognizant OIPT leader 180 days after Milestone A approval. A favorable Milestone A decision does not yet mean that a new acquisition program has been initiated. Milestone A approval can lead to concept exploration or component advanced development depending on whether an evaluation of multiple concepts is desired or if a concept has been chosen, but more work is needed on key sub-systems or components before a system architecture can be determined and the technologies can be demonstrated in a relevant environment.

11-35. Concept exploration work effort

a. Concept exploration typically consists of competitive, parallel, short-term concept studies. The focus of these efforts is to define and evaluate the feasibility of alternative concepts and to provide a basis for assessing the relative merits (i.e., advantages and disadvantages, degree of risk, etc.) of these concepts. The AoA, discussed later in the chapter, is used to facilitate comparisons of alternative concepts. In order to achieve the best possible system solution, emphasis is placed on innovation and competition. To this end, participation by a diversified range of businesses (i.e., small, new, domestic, and international) is encouraged. Alternative system design concepts are primarily solicited from private industry and, where appropriate, from organic activities, international technology and equipment firms, Federal laboratories, federally funded research and development centers, educational institutions, and other not-for-profit organizations. The work in concept exploration normally is funded only for completion of concept studies contracts. The work is guided by the approved MNS.

b. The most promising system concepts are defined in terms of initial, broad objectives for cost, schedule, and performance; identification of interoperability, security, technology protection, operational support, and infrastructure requirements within a family of systems; opportunities for tradeoffs, and an overall acquisition strategy and test and evaluation strategy (including development test (DT), operational test (OT), and live fire testing (LFT)). This work effort ends with a review, at which the MDA selects the preferred concept (alternative) to be pursued for which technologies are available.

11-36. Decision review

During concept exploration, the MDA may hold a decision review to determine if additional component development is necessary before key technologies will be sufficiently mature to enter system development and demonstration phase for one of the concepts under consideration. If the concepts do not require technologies necessitating additional component development, the appropriate milestone (B or C) is held in place of this review.

11-37. Program initiations in advance of Milestone B

The practical result of a preference for more mature technology is initiation of individual programs at later stages of development, after determination of technology maturity. As a consequence, most acquisition programs are initiated at Milestone B. On the rare occasions when an earlier program initiation is appropriate, it takes place at entry to or during component advanced development. At program initiation in advance of Milestone B, the MDA approves the AS, the APB, IT certification for major automated information systems (MAISs), and exit criteria for the component advanced development work effort if not already established.

11-38. Component advanced development work effort

The project shall enter component advanced development when the ICT leader has a concept for the needed capability, but does not yet know the system architecture. Unless otherwise determined by the MDA, the component technology to be developed shall have been proven in concept. The project shall exit component advanced development when a system architecture has been developed and the component technology has been demonstrated in the relevant environment or the MDA decides to end this effort. This effort is intended to reduce risk on components and subsystems that have only been demonstrated in a laboratory environment and to determine the appropriate set of subsystems to be integrated into a full system. This work effort normally is funded only for the advanced development work. The work effort is guided by the validated MNS, but during this activity, an ORD is developed by the CBTDEV-led ICT to support program initiation. Also, acquisition information necessary for a milestone decision (i.e., the acquisition strategy, program protection plan, etc.) is developed. This effort is normally followed by entry into the system development and demonstration phase after a Milestone B decision by the MDA.

11-39. Systems acquisition activity

Systems acquisition is the process of developing concepts into producible and deployable products that provide capability to the user. The concept to exploit in systems acquisition is based on an analysis of alternative ways to meet the military need (done either in concept exploration or technological opportunities development), including commercial and non-developmental technologies and products and services determined through market analysis. The CBTDEV responsible for the mission area in which a deficiency or opportunity has been identified, but not the MATDEV, normally prepares the AoA. The goal is to develop the best overall value solution over the system's life cycle that meets the user's operational requirements.

11-40. System development and demonstration phase

a. The purpose of the system development and demonstration phase is to develop a system, reduce program risk, ensure operational supportability, design for producibility, ensure affordability, and demonstrate system integration, interoperability, and utility. Discovery and development are aided by the use of simulation-based acquisition and test and evaluation and guided by a system AS and TEMP. System modeling, simulation, test, and evaluation activities are integrated into an efficient continuum planned and executed by a test and evaluation

working-level integrated product team (TEWIPT). This continuum features coordinated test events, access to all test data by all involved Agencies, and independent evaluation of test results by involved Agencies. Modeling, simulation, and DT are under the direct responsibility of the PM or a designated test agency. All results of early operational assessments are reported by the ATEC used by the MDA in support of decisions. The independent planning, execution, and evaluation of dedicated initial operational test (IOT), as required by law, and follow-on operational test (FOT), if required, are the responsibility of ATEC.

b. This phase can be entered either directly out of technology opportunity and user need activities or from concept exploration. The actual entry point depends on the maturity of the technologies, validated requirements (including urgency of need), and affordability. The MDA determines the appropriate entrance point, which is Milestone B. There is only one Milestone B per program, or evolutionary block.

c. HQDA, along with the other services, is authorized by DOD to maintain a transition fund in the out-years of the FYDP to allow rapid transition of military or commercial projects from technology opportunity and user needs activities to system development and demonstration or commitment to low-rate production. HQDA determines the size of its transition fund. The transition fund for the first year of the program is distributed to individual budget lines prior to submission of the budget estimate submission (BES) for that year.

11-41. Entrance criteria

a. Entrance into system development and demonstration is dependent on three things: technology (including software) maturity, validated requirements, and funding. Unless some other factor is overriding in its impact, the maturity of the technology determines the path to be followed. Programs that enter the process at Milestone B have a system architecture and an operational architecture for their relevant mission area.

b. Technology is developed in S&T or procured from industry. Technology must have been demonstrated in a relevant environment or, preferably, in an operational environment (using the transition mechanisms) to be considered mature enough to use for product development in systems integration. If technology is not mature, alternative technology is used that is mature and that can meet the user's needs. The determination of technology maturity is made by the Army S&T Executive, with review of the determination for potential MDAPs by the DUSD(S&T).

c. Prior to entering system development and demonstration, there must be a HQDA approved ORD. The ORD, discussed later in this chapter, contains operational performance requirements and addresses cost for a proposed concept or system. Time-phased ORDs must be approved by HQDA prior to program approval. If a mature technology, non-developmental item, or commercial item is being considered for transition to an acquisition program at Milestone B or C, it must have an approved ORD prior to being approved as an acquisition program.

d. The affordability determination is made in the process of addressing cost as a military requirement in the requirements process and included in each ORD (paragraph 8), beginning with the acquisition cost but using life-cycle cost or total ownership cost where available and approved. Transition into system development and demonstration also requires full funding (i.e., inclusion in the budget and out-year program of the funding for all current and future efforts necessary to carry out the acquisition strategy), which is programmed when a system concept and design have been selected, a PM has been assigned, an ORD has been approved, and system-level development is ready to begin. In the case of a replacement system, when the Milestone B

is projected to occur in the first 2 years of the FYDP under review, the program shall be fully funded in that PPBS/PPBES cycle. In no case shall full funding be done later than Milestone B, unless a program first enters the acquisition process at Milestone C.

11-42. Milestone B

Milestone B is normally the initiation of an acquisition program. The purpose of Milestone B is to authorize entry into system development and demonstration.

a. Prior to approving entry into system development and demonstration at Milestone B, the MDA considers the validated ORD, system threat assessment (STA), program protection, independent technology assessment and any technology issues identified, any early operational assessments or test and evaluation results, AoA, the CCA, manpower estimate (if applicable), system affordability and funding, the proposed AS, cooperative opportunities, and infrastructure and operational support. At Milestone B the MDA confirms the AS approved prior to release of the final RFP and approve the development APB, LRIP quantities (where applicable), and system development and demonstration exit criteria (and exit criteria for interim program review, if necessary).

b. For MDAPs, the DOT&E and the cognizant OIPT leader approves the TEMP (including the LFT strategy, if applicable) for all OSD test and evaluation oversight programs. If full-up, system-level LFT is unreasonably expensive and impractical, a waiver can be approved by the DAE, for programs where he or she is the MDA, or by the AAE, for programs where he or she is the MDA, and an alternative live fire test and evaluation (LFT&E) plan shall be approved by the DOT&E before entry into system development and demonstration phase.

11-43. Entry into system development and demonstration

a. Milestone B approval can lead to system integration or system demonstration. Regardless of the approach recommended, PMs and other acquisition managers continually assess program risks. Risks must be well understood, and risk management approaches developed, before decision authorities can authorize a program to proceed into the next phase of the acquisition process. Risk management is an organized method of identifying and measuring risk and developing, selecting, and managing options for handling these risks. The types of risk include, but are not limited to, schedule, cost, technical feasibility, risk of technical obsolescence, software management, dependencies between a new program and other programs, and risk of creating a monopoly for future procurements.

b. The nature of software-intensive system development, characterized by a spiral build-test-fix-test-deploy process, may lend itself to a combined system integration and system demonstration, rather than serial efforts more typical of hardware-intensive systems.

11-44. System integration work effort

The program enters system integration when the PM has an architecture for the system, but has not yet integrated the subsystems into a complete system. The program exits system integration when the integration of the system has been demonstrated in a relevant environment using prototypes (i.e., first flight, interoperable data flow across systems), a system configuration has been documented, the MDA determines a factor other than technology justifies forward progress, or the MDA decides to end this effort. This effort is intended to integrate the subsystems and reduce system-level risk. The work effort is guided by a validated ORD. The work effort is followed by system demonstration after a successful interim progress review by the MDA (or the person designated by the MDA).

11-45. Interim progress review

The purpose of an interim program review is to confirm that the program is progressing within the phase as planned or to adjust the plan to better accommodate progress made to date, changed circumstances, or both. If the adjustment involves changing the AS, the change must be approved by the MDA. There is no required information necessary for this review other than the information specifically requested by the decision-maker.

11-46. System demonstration work effort

The program enters system demonstration when the PM has demonstrated the system in prototype articles. This effort is intended to demonstrate the ability of the system to operate in a useful way consistent with the validated ORD. This system development and demonstration phase ends when a system is demonstrated in its intended environment, using engineering development models or integrated commercial items; meets validated requirements; industrial capabilities are reasonably available; and the system meets or exceeds exit criteria and Milestone C entrance requirements. Preference is given to the use of M&S as the primary method for assessing product maturity where proven capabilities exist, with the use of test to validate modeling and simulation results. The completion of this phase is dependent on a decision by the MDA to commit to the program at Milestone C or a decision to end this effort.

11-47. Production and deployment phase

The purpose of the production and deployment phase is to achieve an operational capability that satisfies mission needs. The production requirement of this phase does not apply to MAISs. However, software has to prove its maturity level prior to deploying to the operational environment. A system must be demonstrated before commitment to production (or procurement) and deployment. For DOT&E oversight programs, a system cannot be produced at full-rate until a beyond low-rate initial production report has been completed and sent to Congress, the SecDef, and the USD(AT&L). The MDA makes the commitment decision at Milestone C. Milestone C can be reached directly from pre-systems acquisition (i.e., a commercial product) or from system development and demonstration phase.

11-48. Entrance criteria

Regardless of the entry point, approval at Milestone C is dependent on the following criteria being met (or a decision by the MDA to proceed):

a. Technology maturity (with an independent technology readiness assessment), system and relevant mission area (operational) architectures, mature software capability, demonstrated system integration or demonstrated commercial products in a relevant environment, and no significant manufacturing risks.

b. An approved ORD.

c. Acceptable interoperability.

d. Acceptable operational supportability.

e. Demonstration that the system is affordable throughout the life cycle, optimally funded, and properly phased for rapid acquisition.

11-49. Milestone C

a. The purpose of this milestone is to authorize entry into low-rate initial production (for MDAPs and major systems), into production or procurement (for non-major systems that do not

require low-rate production) or into limited deployment for MAIS or software-intensive systems with no production components.

b. The following are milestone approval considerations:

(1) Prior to making the milestone decision, the MDA considers the component cost analysis (CCA), and, for MAISs, the CCA and economic analysis, the manpower estimate, compliance with the CCA, STA, and an established completion schedule for *National Environmental Policy Act (NEPA)* compliance covering testing, training, basing, and operational support.

(2) At this milestone, the MDA confirms the AS approved prior to the release of the final RFP and approve an updated development APB, exit criteria for LRIP (if needed) or limited deployment, and the ADM.

(3) The DOT&E and cognizant OIPT leader approve the TEMP for all OSD T&E oversight programs. IT acquisition programs (regardless of ACAT) that entered system acquisition at Milestone C are registered with the DOD CIO before Milestone C approval.

(4) A favorable Milestone C decision authorizes the PM to commence LRIP or limited deployment for MDAPs and major systems. The PM is only authorized to commence full-rate production with further approval of the MDA. There is normally no more than one decision (i.e., either low-rate or full-rate) at the DAE-level for MDAPs.

11-50. Low-rate initial production (LRIP) work effort

a. This work effort is intended to result in completion of manufacturing development in order to ensure adequate and efficient manufacturing capability and to produce the minimum quantity necessary to provide production configured or representative articles for IOT, establish an initial production base for the system; and permit an orderly increase in the production rate for the system, sufficient to lead to full-rate production upon successful completion of operational (and live-fire, where applicable) testing. The work is guided by the approved ORD.

b. Deficiencies encountered in testing prior to Milestone C are resolved prior to proceeding beyond LRIP (at the Full-Rate Production (FRP) Decision Review) and any fixes verified in IOT. Outline test plans (OTPs) are provided to the DOT&E for oversight programs in advance of the start of operational testing.

c. LRIP may be funded by RDTE appropriation or by procurement appropriations, depending on the intended usage of the LRIP assets.

d. LRIP quantities are minimized (no more than 10 percent of the total production quantity documented in the AS). The MDA determines the LRIP quantity for MDAPs and major systems at Milestone B. Any increase in quantity after the initial determination is approved by the MDA. The LRIP quantity will not be less than one unit. When approved LRIP quantities are expected to be exceeded because the program has not yet demonstrated readiness to proceed to full-rate production, the MDA assesses the cost and benefits of a break in production versus continuing annual buys.

e. The DOT&E determines the number of LRIP articles required for LFT and IOT of DOT&E oversight programs. For a system that is not a DOT&E oversight program, ATEC determines the number of LRIP articles required for IOT. LRIP is not applicable to AISs or software intensive systems with no developmental hardware. However, a limited deployment phase may be applicable.

11-51. Full-rate production (FRP) decision review

a. Before making the full-rate production and deployment decision, the MDA considers—

- The CCA, and for MAISs, the CCA and economic analysis.
- The manpower estimate (if applicable).
- The results of operational and live fire test (if applicable).
- CCA compliance certification and certification for MAISs .
- C4I supportability certification.
- Interoperability certification.

b. The MDA confirms the AS approved prior to the release of the final RFP, the production APB, and the ADM.

11-52. Full-rate production and deployment work effort

Following IOT, the submission of the Beyond LRIP and LFT&E reports (where applicable) to Congress, the SecDef, and the USD(AT&L), and the completion of a full-rate production decision review by the MDA (or by the person designated by the MDA), the program enters full-rate production (or procurement) and deployment.

11-53. Sustainment activity/phase

The objectives of this activity phase are the execution of a support program that meets operational support performance requirements and sustainment of systems in the most cost-effective manner for the life cycle of the system.

11-54. Sustain systems work effort

a. Sustainment program. The sustainment program includes all elements necessary to maintain the readiness and operational capability of deployed systems. The scope of support varies among programs but generally includes supply, maintenance, transportation, sustaining engineering, data management, configuration management, manpower, personnel, training, habitability, survivability, safety, occupational health, IT supportability and interoperability, and environmental management functions. This activity also includes the execution of operational support plans. Programs with software components must be capable of responding to emerging requirements that will require software modification or periodic enhancements after a system is deployed. A follow-on operational test program that evaluates operational effectiveness, survivability, suitability, supportability, and interoperability, and that identifies deficiencies is conducted, as appropriate.

b. Evolutionary sustainment. Supporting the tenets of evolutionary acquisition, sustainment strategies must evolve and be refined throughout the life cycle, particularly during development of subsequent blocks of an evolutionary strategy, modifications, upgrades, and reprocurement. The PM ensures that a flexible, performance-oriented strategy to sustain systems is developed and executed. This strategy includes consideration of the full scope of operational support, such as maintenance, supply, transportation, sustaining engineering, spectrum supportability, configuration and data management, manpower, training, environmental, health, safety, disposal and security factors. The use of performance requirements or conversion to performance requirements are emphasized during reprocurement of systems, subsystems, components, spares, and services after the initial production contract.

11-55. Dispose of systems work effort

At the end of its useful life, a system must be demilitarized and disposed. The PM must address in the AS demilitarization and disposal requirements and ensure that sufficient information exists so that disposal can be carried out in a way that is in accordance with all legal and regulatory requirements relating to safety, security, and the environment. The Defense Reutilization and Marketing Office executes the PM's strategy and demilitarize and dispose of items assigned to the Office.

11-56. Total package fielding (TPF) process

a. TPF is currently the Army's standard fielding process. In 1984 the Army began using TPF on a test basis and made it the standard fielding process in 1987. It is designed to ensure thorough planning and coordination between CBTDEVs/TNGDEVs, MATDEVs/fielding commands, and the gaining MACOMs and using units involved in the fielding of new materiel systems. At the same time, it is designed to ease the logistics burden of the using and supporting Army troop units. Regulatory and instructional guidance for materiel release, fielding, and transfer are contained in AR 700-142, and DA Pamphlet 700-142 respectively. TPF process is shown in Figure 11-8.

b. Identification of the TPF package contents for a particular fielding is known as establishment of the materiel requirements list (MRL). It is the responsibility of the MATDEV/fielding command to identify everything that is needed to use and support the new system and coordinate these requirements with the CBTDEVs/TNGDEVs and the gaining MACOMs. The total fielding requirements are documented, coordinated, and agreed on through the MFP and/or memorandum of notification (MON), the mission support plan (MSP) and the materiel fielding agreement (MFA).

c. The Defense Logistics Agency (DLA) operates unit materiel fielding points (UMFPs) in Pennsylvania, Texas, and California that support the Army. These three DLA UMFPs are sites where initial issue items are consolidated to support TPF worldwide. The staging site is the facility or location where the total package comes together. It is usually here that all end items, support equipment, and packages, if initial issue spare and repair parts, are prepared for handoff to the gaining units. To support TPF outside the Continental United States (OCONUS), the AMC operates a number of central staging sites in Europe, and two sites in Korea.

d. A joint supportability assessment takes place about 90 days before the projected FUED and 60 days before fielding to a unit in CONUS. The fielding command assures that those items requiring deprocessing are inspected and made fully operational-ready before handoff to the gaining units. A joint inventory is conducted by the fielding and gaining commands to ensure all needed items are received, or placed on a shortage list for later delivery.

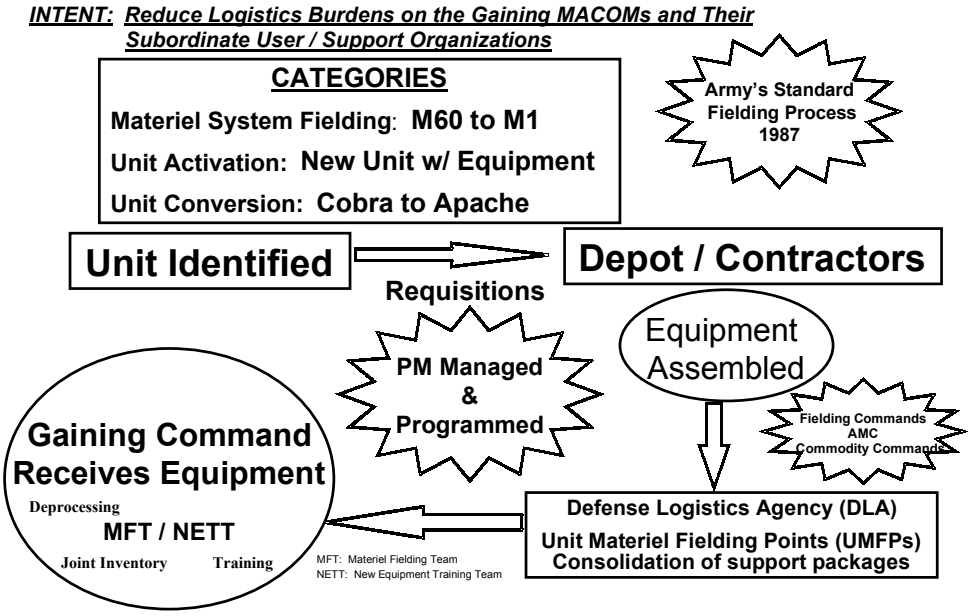


Figure 11-8. Total Package Fielding Concept

e. The fielding command provides, at the time of handoff, a tailored customer documentation package for each gaining unit that allows the unit to establish property accountability and post a receipt for TPF materiel. The transactions in the package are tailored to the specific supply system in use at the unit. Each unit can choose between three media for their documentation package – hardcopy, magnetic tape, or floppy disk. Logistics changes are helping the U.S. Army prepare for the challenges and missions of the 21st century. Many of these changes will apply directly to TPF. Improved equipment, communications, automation, and transportation will continue to keep the U.S. Army the best equipped and supported Army in the world

11-57. Army system of systems (SoS)/unit set fielding (USF)

a. Introduction.

(1) Army units have often experienced the TPF of 35-90 unsynchronized and non-integrated systems fieldings or software drops for major systems in a single year. This has been very disruptive to the unit's training program and readiness posture and has rarely provided to the unit a complete and fully integrated capability. A disciplined, synchronized approach that focuses the fieldings of systems and software into a single window designated specifically for modernization and training is crucial to reducing the disruptive impacts upon gaining units. This approach is USF.

(2) USF is a new management process for modernizing units by fielding fully integrated unit sets of equipment in support of the Army Transformation Campaign Plan (ATCP). This process expands on the current single system fielding process. The concepts will be applied to modernizing the 1ST Cavalry Division (1CD) and the first two Interim Brigade Combat Teams (IBCTs). Insights gained with these units will be the basis for developing the formal policies and procedures to institutionalize the process.

b. Army SoS management process. Under the current modernization/fielding process, units may receive multiple, separate, and unsynchronized issues of individual systems throughout the year. These TPF fieldings, previously discussed, are generally sequenced according to the DA master priority list (DAMPL) and Army order of precedence (AOP)

memoranda. Each fielding has an impact upon the unit's readiness. With these multiple fieldings in a year, units have a difficult time maintaining unit readiness and achieving optimum effectiveness of the newly issued systems. Additionally, equipment is often fielded without the appropriate corresponding training modernization and training and installation/infrastructure items. As the Army moves forward with modernization and transformation efforts, the environment must shift from a focus on fielding "stand alone" systems to fielding "systems of systems" to maximize each unit's capabilities. The Army must develop a schedule for modernization, which forces synchronization of: requirements generation, materiel development, manpower and personnel considerations, funding, testing, training, fielding, and sustainment.

(1) The key to managing unit-configured sets of equipment is ensuring that all the available components for a required operational capability are properly integrated as a unit set. Subsequently, the hardware and particularly the software require updating and hardware or software errors must be corrected. An Army configuration management process is required that synchronizes, tests, integrates, and certifies hardware and software unit sets.

(2) The Army SoS management process will synchronize planning and execution of the activities required to field interrelated and interdependent systems to include training devices. It will provide a basis for POM input focused on enhancing unit warfighting capabilities and better enable HQDA to develop an effective force and defend the POM and budget.

c. USF process. For a unit to realize the full capability of new weapons, sensors, digital command and control systems, and training devices, equipment must be integrated, issued, and upgraded as a unit set. The Army requires a plan that packages these required items and identifies windows for fielding new capabilities by unit sets.

(1) Individual components or systems may provide significant standalone improvements in capability, but they do not achieve their full potential until they are integrated with the other systems comprising the unit-configured set. System integration plays a key role in prioritization of program adjustments at both technical and programmatic levels. The SoS management process provides a disciplined approach that identifies and synchronizes system fieldings and maximizes unit operational readiness. The disciplined approach to achieve this goal is USF.

(2) The key to USF is ensuring that all the components and associated support items of equipment (ASIOE) for a required capability are present and integrated during the fielding process. Unit sets of hardware and software must be identified and interoperability certified to establish a configuration baseline prior to fielding. That baseline must be maintained after fielding.

(3) USF serves as the synchronizing process to ensure that system fieldings are implemented in an integrated and complimentary fashion that supports a unit's modernization with the minimum disruption to unit readiness. USF applies to all Active Army and Reserve Component unit modernization.

d. USF cycle. The USF process is a cycle that begins five to seven years prior to the beginning of the unit's USF window and ends approximately two years after the window closes. A USF cycle consists of five steps: preparation, reorganization, equipping, training, and validation. The cycle may restart two years after step four is completed

(1) *Step 1 (Preparation):* This step covers actions from about five to seven years (lead-time for military construction, Army (MCA) projects) to six months before a unit enters its USF window. The Army modernization fielding plan (AMFP) defines the USF windows and will drive the development of the POM. MATDEVs estimate resource and transportation requirements in support of the AMFP to assist DA with the POM build process. MATDEVs also

conduct surveys of installation facilities: ranges; motor pools; warehouses; training infrastructure, support, and facilities, information infrastructure requirements, etc. These requirements are then submitted to DCSOPS and MACOMs for inclusion in the POM build. Unit force modernization staffing is increased to support USF planning and execution. MACOMs and units receive the critical mission equipment list and schedule the USF windows on their long range training calendars. Other key actions include: identification of the unit to be modernized (HQDA unit identification code (UIC)); operational architecture finalization; systems architecture finalization; support strategy development; POM adjustments; development of the systems list comprising the unit set; development of training and sustaining documentation; integration testing to validate the unit's hardware/software configuration baseline; and identification of all changes for manning the units as well as any special personnel requirements for soldiers and leaders. During this phase the MATDEV prepares to execute the USF mission. The MACOM and unit will receive a detailed materiel fielding schedule (MFS) two years out. Notification memoranda are provided to the gaining MACOM and unit three years prior to fielding. The timing of this notification will coincide with development of MACOM POM submissions. HQDA will generate disposition instructions eighteen months out for the excess/displaced equipment that will trigger planning and resourcing to dispose of this equipment. New materiel introductory briefings (NMIB) and reorganization planning will begin one year out. Six months prior to a unit entering a window, the system of system manager (SOSM) will chair a review of the status all preparations to determine whether or not to proceed with the USF process.

(2) *Step 2 (Reorganization):* Unit reorganization begins about six months prior to the USF window and concludes at E-date. This reorganization includes actions and activities required to transition from the unit's current MTOE to a new MTOE, which reflects the new equipment in the unit. Facilities are completed, training devices, training support infrastructure, and tactics, techniques, and procedures (TTPs) are in place, personnel are assigned, and equipment turn-ins are completed.

(3) *Step 3 (Fielding):* Systems in the unit set will be fielded during the window. The PM for each system will conduct NET. Completion of NET for all systems in the unit set closes the window and the unit will be taken off C5 status.

(4) *Step 4 (Training):* The unit is responsible for conducting collective and sustainment training. This training will start after completion of NET and will normally be completed within 18 months after the unit's E-date.

(5) *Step 5 (Validation):* The MACOM is responsible for validating the operational readiness of the unit to execute its assigned mission. Validation will be the final activity conducted during the training step. MACOM validation completes the USF cycle.

11-58. Additional considerations

The above discussion examined the activities performed in each phase of the nominal life-cycle of an acquisition system according to the current DODD 5000.1, DODI 5000.2, and AR 70-1. This is not to imply that all system developments must follow this exact sequencing of life-cycle phases and activities. On the contrary, DODI 5000.2 specifically authorizes and encourages a PEO/PM to devise program structures and acquisition strategies to fit the particulars of a program; an approach called "tailoring." Additionally, where justified (i.e., a NDI acquisition), milestones and phases may be omitted or combined, a procedure called "streamlining." Other aspects of acquisition planning and strategy; for example, involving P3I and technology insertion can also be accommodated under the broad guidance and direction contained in DODD 5000.1

and DODI 5000.2. What remains constant is the task to develop and deliver combat-capable, cost-effective, and supportable systems to our Armed Forces.

SECTION VII
ACQUISITION DOCUMENTATION

11-59. Materiel requirements documents (MRDs)

MRDs establish the need for a materiel acquisition program, how the materiel will be employed, and what the materiel must be capable of doing. As the acquisition program progresses, statements of required performance and design specifications become more and more specific. The MNS is the document that initiates the acquisition system management process. The ORD is the document that defines the system capabilities needed to satisfy an approved MNS, and is developed during Phase A, Concept and Technology Development.

a. Mission need statement (MNS).

(1) The MNS is a nonsystem-specific statement of operational capability need. The Unified Commands, the Military Departments, OSD, or the Joint Staff may identify mission needs. The CBTDEV is the proponent for the development of the MNS, but other participants in the process include the MATDEV, manpower and personnel planners, the TNGDEV, and the logistician. In preparing the MNS, mission needs are identified as a direct result of continuing assessments of current and projected capabilities in the context of changing military threats and national defense policy. The MNS reflects an evaluation that a nonmateriel solution is not a viable consideration. Potential materiel alternatives such as commercial systems, or known systems or programs addressing similar needs that are deployed or are in development or in production by any of the Services or allied nations are identified in the document.

(2) The MNS describes key boundary conditions related to infrastructure support that may impact on satisfying the need. These include logistics support; transportation; mapping, charting, and geodesy support; manpower, personnel, and training constraints; command control, communications, and intelligence interfaces; security; and standardization or interoperability within the North Atlantic Treaty Organization (NATO) or with other allies or DOD components. The document also contains a description of operational environments (including conventional; initial nuclear weapon effects; nuclear, biological, and chemical contamination; electronic; and natural) in which the developing system is expected to operate. The MNS is a one-time document, which is not revised. Potential ACAT I / IA MNSs format and content is in CJCSI 3170.01A, Enclosure A.

(3) MNSs that could potentially result in the initiation of new ACAT I programs are forwarded through DA, to the JROC for review and validation that the mission cannot be satisfied by a nonmateriel solution. The JROC determines the validity of the identified need, assigns a joint priority as appropriate, and forwards the MNS to the USD(AT&L) for appropriate action. For approved MNSs, a subordinate OIPT of the DAB reviews them for materiel alternatives and recommended study efforts prior to the DAB convening for a MS A, Concept Studies Approval, review.

b. Operational requirements document (ORD).

(1) Each concept proposed at MS B is described in an initial ORD in terms of minimum acceptable requirements (thresholds) that defines the system capabilities needed to satisfy a MNS. When appropriate, objectives for each parameter representing a measurable, beneficial

increment in operational capability or operations and support are established. Objectives should not be stated if they cannot be supported with operational rationale.

(2) ACAT ID and IAM ORDs are approved by the JROC unless previously delegated. All other Army-generated ORDs are approved by HQDA. ORDs are refined and expanded for MS C to include thresholds and objectives for more detailed and refined performance capabilities and characteristics based on the results of trade-off studies and testing conducted during phase B. After MS C, ORDs are only refined when there is a change in the mission need or the CBTDEV/TNGDEV determines a need to significantly change the performance envelope represented by the ORD minimum acceptable value (threshold) requirements. The MATDEV uses the ORD to develop system performance requirements for contract specifications during each acquisition phase.

(3) ORDs specify at least two levels of performance characteristics, minimum acceptable value (threshold) requirement and objective requirement (DODI 5000.2 and CJCSI 3170.01A). The objective requirement for parameters is provided only when the CBTDEV/TNGDEV desire a relevant and operationally significant capability above the threshold requirement. ORDs identify recommended KPPs to appropriately focus the acquisition effort and decision-making. ORDs are adjusted only after the CBTDEV or TNGDEV, as appropriate, and the MATDEV agree that such changes are necessary to authorize development of the system or TADSS to the required capability. ORD format and content is in CJCSI 3170.01A.

c. Capstone requirements documents (CRDs). CRDs can be a combination of two or more MNS/ORDs/programs, which, when considered together form a family-of-systems (FoS) or SoS. The CRD identifies systems requirements to define a mission area and serves as a guide for ORD development. The CRD is the bridge between the MNS and program ORDs. It is appropriate when a mission area requires more than one ORD and provides guidance to support ORD development. The CRD should be developed after the MNS is validated and prior to MS A. The CRD may identify common requirements that must be included in all program ORDs. Approval authorities may add or delete KPPs to ensure program ORDs are consistent with the CRD. The CRD is not an ORD and is not intended to be testable. It is a living document that reflects changes in threat or technologies.

d. Operational need statement (ONS). Operational field commanders use an ONS to document the urgent need for a materiel solution to correct a deficiency or to improve a capability that impacts upon mission accomplishment. The ONS provides an opportunity to the field commander, outside of the acquisition and CBTDEV/TNGDEV communities, to initiate the requirements determination process. The ONS is not a materiel requirements document. The CBTDEV, TNGDEV or MATDEV communities do not initiate or develop an ONS. Response to an ONS varies depending on the criticality of the need for the proposed item. Response can range from a HQDA directed requirement and fielding of a materiel system to the forwarding of the action to TRADOC for review and routine action. HQDA may decline to favorably consider an ONS for a variety of reasons, including conflicting needs, higher priorities for funding, existence of a similar system, or nonconcurrence of the criticality of the need. The response to an ONS is based on an ARSTAF validation supported by TRADOC, AMC, and MATDEV reviews. ODCSOPS determines validity of the need, availability of technology, and source of resources to fill this requirement. If the need is determined to be urgent, critical, and can be resourced (at least for the present situation) a directed requirement may result. If no solution is available or if the need is not urgent or critical the ONS will be turned over to CBTDEVs, TNGDEVs and MATDEVs to find solution. All ONS are reviewed by the CBTDEVs/TNGDEVs to determine

applicability to future requirements or continuing need for which a standard requirement (ORD) and acquisition is needed. If validation of the ONS indicates that the concept has potential for Army-wide application and development of a new system is appropriate, TRADOC will initiate a MNS and/or ORD as appropriate. If validation indicates that there exists a specific limited but necessary critical need, HQDA may issue a directed requirement for ONS having Army-wide application; however, tailored development and standard documentation should be used in this instance. The ONS process may shorten NDI acquisition by shortcutting the requirements determination process enroute to a buy decision; however; the ONS is more important to users because it starts the requirements determination process moving in the absence of any other impetus.

11-60. Other service requirements

The CBTDEV/TNGDEV reviews other Service warfighting capability requirements documents for potential Army interest. When the Army chooses to participate in the RDA of another Service program, HQDA initiates action to validate and approve the documentation. When another Service requirement document, to include an approved production RFP, adequately describes an Army requirement, the document may be approved as the Army requirement, that is, an ORD. The Army may also acquire other Service equipment with a national stock number (NSN) that has been identified through the MATDEV market investigation and meets an approved Army need. For joint programs, requirements documents are prepared and processed in accordance with the lead services procedures. Service peculiar requirements may be documented in the other Service's ORDs and other requirement documents.

11-61. Catalog of approved requirements documents (CARDS)

CARDS is an unclassified DCSOPS publication that provides information on the status of approved requirements documents. It includes both active and inactive documents. An active document or assignment of a CARDS reference number does not automatically authorize the expenditure of funds. Each program must compete for funds in the Army prioritization and programming process. ODCSOPS assigns a CARDS reference number to each requirements document after approval and prior to publication and distribution.

11-62. Program review documentation and program plans

The MDA is responsible for identifying the minimum amount of documentation necessary for milestone review purposes. Only those mandatory formats called for by DODI 5000.2 are required. All other formats are used as guidance only. Program plans are a description of the detailed activities necessary for executing the AS. Program plans belong to the PM and are used by the PM to manage program execution throughout the life-cycle of the program. The PM, in coordination with the PEO, determines the type and number of program plans. Program plans, excluding the TEMP, are not required in support of milestone decisions and are not required for milestone documentation or as periodic reports. Some of the typical program plans used to support the execution of a program's AS are:

a. System threat assessment report (STAR). The STAR is the basic authoritative threat assessment that supports the development and acquisition of a particular ACAT I or II system. The STAR contains an integrated assessment of projected enemy capabilities (doctrine, tactics, hardware, organization and forces) at IOC and IOC plus 10 years, to limit, neutralize or destroy the system. It explicitly identifies critical intelligence categories (CICs) which are a series of threat capabilities that could critically impact the effectiveness and survivability of the program. The STAR is a dynamic document that is continually updated and refined as a program develops.

It is approved and validated in support of ASARC/DAB reviews. This report is the primary threat reference for the ORD, the modified integrated program summary (MIPS), the AoA, and the TEMP developed in support of a MDR. The STAR is approved by DCSINT and validated by the DIA for all ACAT I programs at MS B and updated for all ACAT ID programs at MS C and MS FRP. It is prepared for DCSINT review and approval for ACAT II and III programs, to include highly sensitive classified programs unless specifically waived by the MDA.

b. Modified integrated program summary (MIPS). The MIPS, with its annexes, is the primary Army decision document used to facilitate top-level acquisition milestone decision-making. It provides a comprehensive summary of program structure, status, assessment, plans, and recommendations by the PM and the PEO. The primary functions of the MIPS include a summary of where the program is versus where it should be; a description of where the program is going and how it will get there; an identification of program risk areas and plans for closing risks; and a basis for establishing explicit program cost, schedule, and performance objectives. It also includes thresholds in the stand-alone APB and program-specific exit criteria for the next acquisition phase. The MIPS provides answers to the following five key MDR core issues:

(1) Is the system still needed?

(2) Does the system work (from the viewpoints of the user, functional staffs, and the PM)?

(3) Are major risks identified and manageable?

(4) Is the program affordable (is adequate programming in the POM)?

(5) Has the system been subjected to CAIV analysis?

c. Acquisition strategy (AS). The AS is the framework for planning, directing, and managing a materiel acquisition program. It states the concepts and objectives that direct and control overall program execution from program initiation through post-production support. An AS is required for all Army acquisition programs. The AS documents how the acquisition program will be tailored and identifies risks and plans to reduce or eliminate risks. The AS, prepared by the MATDEV-led IPT, is a living document that matures throughout the program. It provides fundamental guidance to the functional elements of the MATDEV/CBTDEV organizations. Individual functional strategies leading to the preparation of detailed program plans are required to implement the AS as depicted in Figure 11-9.

d. Environmental analysis. This is a congressionally mandated analysis of the potential environmental impacts of weapons systems. It identifies land, sea or air space requirements of the most promising alternatives and describes the potential effects on the land, sea, and air environment. It also describes the potential impacts on public health and safety by the development, test manufacturing, basing operation, and support of the proposed system. The environmental impact data is weighed against system cost, schedule, and performance in deciding how to best minimize environmental harm.

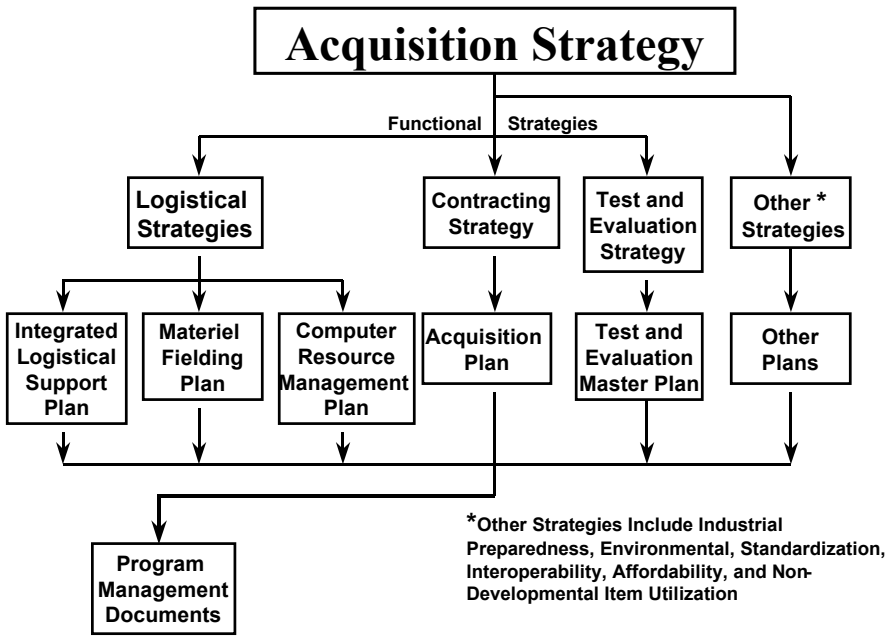


Figure 11-9. Acquisition Strategy

e. Project office estimate (POE) and component cost analysis (CCA). These documents are prepared in support of MS B and all subsequent MS reviews. The cost estimates are explicitly based on the program objectives, operational requirements, and contract specifications for the system, including plans for such matters as peacetime utilization rates and the maintenance concept. The estimates identify all elements of additional cost that would be entailed by a decision to proceed with development, production, and operation of the system. They are based on a careful assessment of risks and reflect a realistic appraisal of the level of cost most likely to be realized. Two cost estimates are prepared. The CBTDEV-led ICT in support of MS B, and the program office in support of MS C and all subsequent milestones do the POE. The other estimate is prepared by an organization that does not report through the acquisition chain. In the Army, this independent cost analysis, entitled CCA, is prepared by the Army CEAC for MDAP systems.

f. Army cost position (ACP). The ACP is the Army's approved life cycle cost estimate for the materiel system. It is used for DOD milestone reviews and is the basis for Army planning, programming and budgeting. For all MDAP programs, the CRB develops the proposed ACP after an intensive review of both the POE and CCA. This proposal becomes the ACP when it is approved by the ASA(FM&C) and then is provided to the AAE. DODI 5000.2 requires the component's cost position.

g. Analysis of alternatives (AoA).

(1) The independent AoA provides information to the decision authority at the MS B review to assist in determining whether any of proposed alternatives to an existing system offer sufficient military and/or economic benefit.

(2) The AoA focuses on broad operational capabilities, potential technology concepts, and materiel solutions that could satisfy the MNS. It examines the full range of materiel alternatives (including those identified in the MS A ADM). AoAs illuminate the relative advantages and disadvantages of alternatives being considered by identifying sensitivities of each alternative to possible changes in key assumptions (i.e., threat) or variables (i.e., selected performance capabilities). The AoA provides insights regarding KPPs for preferred alternatives

and indicates how these parameters contribute to increases in operational capability. It identifies opportunities for trade-offs among performance, cost, and schedule; and determines operational effectiveness and costs (including estimates of training and logistics impacts) for all alternatives.

(3) If a new program is approved, the AoA may be useful for identifying alternatives that will be refined by cost performance trade-off studies during Phase B. It should be useful for limiting the number of alternatives to be considered during phase B. The MDA may direct updates to the AoA for subsequent decision points, if conditions warrant (i.e., AoA may be useful for examining cost-performance trade-offs at MS C).

h. Acquisition program baseline (APB). The APBs consist of the concept baseline, the development baseline, and the production baseline approved at MS B, C, and FRP, respectively. The purpose of the baselines is to enhance program stability and to provide a critical reference point for measuring and reporting the status of program implementation. Each baseline contains objectives for key cost, schedule, and performance parameters. Key parameters must meet minimum acceptable requirements, known as thresholds, at each milestone decision point. The thresholds establish deviation limits from which a PM may not trade-off cost or performance without authorization from the MDA. The APB must cross-walk to the program ORD for performance parameters. The APB must track to the program ORD for performance parameters. Failure to meet the threshold requires a reevaluation of alternative concepts or design approaches. APBs and deviation reporting are required for all acquisition categories.

i. Test and evaluation master plan (TEMP). The TEMP is the basic planning document required for a system that focuses on the overall structure, major elements, and objectives of the T&E program. The TEMP is consistent with the AS as well as the approved MNS, ORD, and C4I support plan and is a reference document used by the T&E community to generate detailed T&E plans and to ascertain schedule and resource requirements associated with a given system. It provides a road map for integrated simulation, test, and evaluation plans, schedules, and resource requirements necessary to accomplish the T&E program. The TEMP describes what testing (i.e., developmental test and operational test) is required, who will perform the testing, what resources will be needed, and what are the requirements for evaluation. It relates program schedule, test management strategy and structure, and required resources to critical operational issues; critical technical parameters; measures of effectiveness and suitability; and milestone decisions points. While the MATDEV has the overall responsibility, each T&E WIPT member contributes to the TEMP development and maintenance. The TEMP is initially developed at a system's first milestone review and is updated before each MS or program decision interim program review, when the program has changed significantly, or when the program baseline has been breached. Upon approval, the TEMP serves as a contract between the MATDEV and T&E community for executing the system T&E program. The TEMP provides key management controls for T&E in support of the acquisition process. Detailed TEMP mandatory procedures and format are at the USD(AT&L), ASD(C3I), and DOT&E Memorandum, 23 October 2000, subject: Mandatory Procedures for MDAPs and MAIS Acquisition Programs.

j. Manpower estimate report (MER). This Congressionally directed report documents the total number of personnel (military, civilian, and contractor) that are or will be needed to operate, maintain, support, and train for a ACAT ID program upon full operational deployment. The validity of the MER is dependent upon force structure, personnel management, and readiness requirements, as well as on the acquisition decision on the size of the buy.

11-63. Typical waivers and reports

a. Live-fire test and evaluation waiver. This certifies to Congress when live-fire survivability testing of a covered major system would be unreasonably expensive and impractical. However, some testing must still be accomplished at the subsystem level as described in the alternate LFT&E plan.

b. Developmental test report. This provides the results of developmental tests to include live-fire test results and reports.

c. System evaluation report. This provides demonstrated system effectiveness, suitability, and survivability information at each formal milestone decision. Report is produced by the independent system evaluator.

d. System assessment report. This provides potential system effectiveness, suitability, and survivability information at key points before and after each milestone decision. Report is produced by the independent system evaluator.

e. Live-fire test and evaluation report. Independent OSD report to Congress that provides test results and assessment of tests on a covered major system or product improvement program realistic survivability testing, and a major munitions or missile program realistic lethality testing. Congress mandates this report.

f. Beyond low-rate initial production report. This provides Congress with an assessment of the adequacy of initial operational testing and whether the test results confirm the items are effective and suitable for combat prior to the FRP decision to proceed beyond low-rate initial production. Congress mandates this report.

g. Defense acquisition executive summary (DAES). This provides standard, comprehensive reporting of ACAT I programs between milestone decision points. The DAES is an internal report for the DAE designed to highlight, on a regular and systematic basis, indications of both potential and actual program problems before they become significant. Recognizing that problems are expected to surface in these programs aids in communication and early resolution.

h. Selected acquisition report (SAR). This report provides standard, comprehensive summary reporting of cost, schedule, and performance information for MDAPs within DOD. The SAR provides the status of total program cost, schedule, and performance, as well as program unit cost and unit cost breach information to Congress.

11-64. Other documentation

a. Acquisition decision memorandum (ADM). The ADM documents the milestone decision authority's decision on the program's AS goals, thresholds, and the exit criteria for the next phase of the program. The ADM is used to document the decision for all ACAT I – IV programs.

b. Integrated program assessment (IPA). Information derived from the PM's MIPS allows the DOD OIPT to develop the IPA for program MDR. The IPA summarizes the DOD independent assessment of the PM's program. It identifies critical areas, issues, and recommendations for the MDA. For ACAT ID and IAM programs the IPA is prepared by the OIPT, approved by the OIPT leader, and submitted to the USD(AT&L) or ASD(C3I), as appropriate.

SECTION VIII
ACQUISITION OVERSIGHT AND REVIEW (O&R) PROCESS

11-65. Process control by decision reviews

The materiel acquisition process is controlled by decisions made as the result of various acquisition programs MDRs conducted by appropriate management levels at program milestones. The reviews are the mechanism for checking program progress against approved plans and for developing revised APBs. Approval of APBs and plans in these reviews does not constitute program-funding approval; allocation of funds in the PPBS process is required.

11-66. Integrated product and process development (IPPD)

As part of acquisition reform efforts, DODD 5000.1 directed the DOD acquisition community to apply the concept of IPPD throughout the acquisition process to the maximum extent practicable. IPPD is a management technique that integrates all acquisition activities starting with requirements definition through production, fielding/deployment and operational support in order to optimize the design, manufacturing, business, and supportability processes. At the core of IPPD implementation are the IPTs. The IPT is composed of representatives from all appropriate functional disciplines working together with a team leader to build successful and balanced programs, identify and resolve issues, and make sound and timely recommendations to facilitate decision-making. There are three general levels of IPTs: OIPTs focus on strategic guidance, program assessment, and issue resolution; working level IPTs (WIPTs) identify and resolve program issues, determine program status, and seek opportunities for acquisition reform; and integrating level integrated product teams (IIPTs), when necessary, is initiated by the PM to coordinate all WIPT efforts and cover all topics not otherwise assigned to another WIPT.

a. Overarching integrated product teams (OIPTs). In support of all ACAT ID and IAM programs, an OIPT is formed to provide assistance, oversight, and review as that program proceeds through its acquisition life-cycle. The OIPT for ACAT ID programs is led by the appropriate OSD Principal Staff Assistant (PSA). The DASD(C3I Acquisition) designates the OIPT Leader for each ACAT IAM. Program OIPTs are composed of the PM, PEO, Component Staff, Joint Staff, USD(AT&L) staff, and the OSD staff principals or their representatives, involved in oversight and review of a particular ACAT ID or IAM program.

(1) In the Army, an OIPT is established at the direction of the MDA for ACAT IC, IAC, II, III, and IV programs. The OIPT is a team of DA staff action officers and the PEO/PM/TSM responsible for integration of oversight issues to be raised to the DAB/ASARC/ ITOIPT/in-process review (IPR) review forums.

(2) The secretary/facilitator of the OIPT for ACAT I and II programs is the OASA(ALT) or ODISC4 DASC (depending where ARSTAF system coordination resides) for that specific program. OIPT membership consists of empowered individuals appointed by ASARC members (ACAT IC, or II programs), by ITOIPT members (ACAT IAC programs) and the MDA for ACAT III and IV programs. Team membership is tailored based on the needs and level of oversight for the individual program. Typical Army OIPT responsibilities include:

(a) Meeting together and individually with the PEO/PM throughout the program progress to raise and resolve issues early, providing recommendations for tailoring and streamlining the program.

(b) Linking vertically with the PM's WIPTs.

(c) Helping the PM successfully achieve a milestone decision

(d) Developing a memorandum documenting the issues/risks to be raised to the MDA with a recommendation to the MDA as to whether an actual ASARC, Army ITOIPT, or IPR needs to be convened, or a "paper ASARC/ITOIPT/IPR" can be held.

(e) Providing an independent assessment for the MDA in preparation of the MDR.

(3) The OIPT, at all levels, generally follow the general procedures which are described below for a typical ACAT ID and IAM program. Initially the OIPT meets to determine the extent of WIPT support needed for the potential program, who shall be members of the WIPTs, the appropriate MS for program initiation, and the minimum information needed for the program initiation review. The OIPT Leader is responsible for taking action to resolve issues when requested by any member of the OIPT or when directed by MDA. The goal is to resolve as many issues and concerns at the lowest level possible, and to expeditiously escalate issues that need resolution at a higher level, bringing only the highest level issues to the MDA for decision. The OIPT meets as necessary over the life of a program.

(4) In support of a planned MDR, the OIPT normally convenes two weeks in advance of the anticipated review to assess information and recommendations being provided to the MDA. Additionally, at that meeting, the PM will propose the WIPT structure, documentation, and strategy for the next acquisition phase, for approval by the MDA. The OIPT Leader, in coordination with the component acquisition executive, recommends to the MDA whether the anticipated review should go forward as planned.

(5) The OIPT leader provides an IPA, previously discussed, at major program reviews or MDRs using data gathered through the IPT process. The OIPT leader's assessment focuses on core acquisition management issues and takes account of independent assessments that are normally prepared by OIPT members.

b. Working-level integrated product teams (WIPTs). WIPTs are established for all acquisition programs. The number and membership of the WIPTs are tailored to each acquisition developmental phase based on the level of oversight and the program needs. They are comprised of DA and/or Service/functional action officers and normally chaired by the PM or designee. WIPTs provide advice to the PM and help prepare program strategies and plans. Each WIPT focuses on a particular topic(s), such as test, cost/performance (CAIV), risk management (both programmatic and safety), etc.

c. Integrating level integrated product teams (IIPTs). When necessary, an IIPT, a type of WIPT, is initiated by the PM to coordinate all WIPT efforts and cover all topics not otherwise assigned to another WIPT.

11-67. The Defense Acquisition Board (DAB)

a. The function of the DAB is to review DOD ACAT ID programs to ensure that they are ready for transition from one program phase to the next. The DAB is the DOD senior level forum for advising the USD(AT&L) on critical decisions concerning ACAT ID programs. The DAB is composed of DOD senior acquisition officials. The board is chaired by the USD(AT&L). The Vice Chairman of the Joint Chiefs of Staff (VCJCS) serves as the vice chairman. Other principal members include the Principal Deputy USD(AT&L); the Under Secretary of Defense (Comptroller); the Assistant Secretary of Defense (Strategy and Requirements); the Director of Operational Test and Evaluation (DOT&E); the Director of Program Analysis and Evaluation (PA&E); Service acquisition executives (SAEs) of the Army, Navy, Air Force; the cognizant OIPT leader; the cognizant PEOs and PMs; and the DAB secretary.

b. Approximately one week prior to the DAB review, a DAB readiness meeting (DRM) meets to pre-brief the USD(AT&L), VCJCS, and other DAB participants, to include cognizant PEO(s) and PM(s). The purpose of the meeting is to update the USD(AT&L) on the latest status of the program and to inform the senior acquisition officials of any outstanding issues. Normally the OIPT leader briefs the DRM. If outstanding issues are resolved at the DRM, the USD(AT&L) may decide that a formal DAB meeting is not required and issue the ADM following the DRM.

c. The JROC reviews all deficiencies that may necessitate development of ACAT I and ACAT IA systems prior to any consideration by the DAB or, as appropriate, DOD CIO at MS B. The JROC validates an identified mission need, assigns a joint potential designator for meeting the need, and forwards the MNS with JROC recommendations to the USD(AT&L). In addition, the JROC continues a role in validation of KPPs in program baselines prior to scheduled reviews for ACAT I and ACAT IA programs prior to all successive MDRs.

d. The OSD Cost Analysis Improvement Group (CAIG) reviews the component cost position, prior to the scheduled MDR and determines if additional analysis is required. The product is an independent cost position assessment and recommendations based on its independent review of the life-cycle cost estimate(s), validation of the methodology used to make the cost estimate(s), and determination if additional analysis or studies is required.

e. A formal DAB review is the last step of the DAB review process. Following presentations by the OIPT and a full discussion, the USD(AT&L) as DAE decides to continue, alter, or terminate the program. This decision is published as an ADM. With the approval of the USD(AT&L), other committee reviews may be held for special purposes, such as to develop recommendations for the DAE on decisions other than milestone or program reviews (i.e., release of "withhold funds," baseline changes, AS changes).

11-68. The Army Systems Acquisitions Review Council (ASARC)

The ASARC is the Army's senior-level advisory body for ACAT IC and II programs and ACAT ID programs (DAB managed) prior to a DAB. The ASARC convenes at formal milestones to determine a program or system's readiness to enter the next phase of the materiel acquisition cycle, and makes recommendations to the AAE on those programs for which the AAE is the MDA. An ASARC may also be convened at any time to review the status of a program. The ASARC is co-chaired by the AAE and the VCSA.

11-69. The HQDA Information Technology Overarching Integrated Product Team (ITOIPT)

a. The ITOIPT is the Army's senior-level advisory body supporting the AAE and DISC4 in their acquisition oversight role of ACAT IAC programs. The purpose of the oversight is to assist managers in resolving major issues supporting information requirements. The ITOIPT is chaired by the DISC4 as the Army CIO.

b. ASARC/ITOIPT membership includes the DUSA(OR); DUSA(IA); ASA(FM&C); ASA(I&E); ASA(M&RA); CG, AMC; CG, TRADOC; GC; DISC4; DCSLOG; DCSOPS; DCSPRO; DCSPER; DCSINT; Chief, Army Reserve; Chief, National Guard Bureau; Chief, Legislative Liaison; MILDEP to the ASA(ALT); DPAE; CG, ATEC and the Army IG (non-voting member). The following organizations are invited to attend if a significant issue is identified within their area of responsibility: The COE; TSG; CG, MTMC; CG, USASMDC; Commander, Safety Center; and the Chief of Public Affairs. The AAE makes the final decision as to attendance at the ASARC or ITOIPT.

c. The effectiveness of the ASARC/ITOIPT review process results from presentation of thorough analysis of all relevant issues and face-to-face discussion among the principals from the Army Secretariat, ARSTAF, and MACOMs (AMC and TRADOC).

11-70. In-process review (IPR)

a. The IPR is a formal review forum for ACAT III, and IV programs. General policies for reviews for IPR programs are the same as for ACAT I and II programs. Reviews are conducted at milestones and at other times deemed necessary by the MDA. The MDA or designee chairs the IPR.

b. The IPR brings together representatives of the MATDEV, the CBTDEV, the trainer, the logistician, and the independent evaluators for a joint review and decision on proceeding to the next phase of development. Their purpose is to provide recommendations, with supporting rationale, as a basis for system concept, system development, type classification, and production decisions by the appropriate level of authority. They are the forums where agencies responsible for participating in the materiel acquisition process can present their views and ensure that those views are considered during development, test, evaluation, and production. Unless informed otherwise, the MATDEV is delegated IPR authority for the system. Participation is extended to the appropriate testing agencies, HQDA representatives, and to such others as the IPR chairman designates. The ASD(C3I), as the DOD CIO, is the MDA for ACAT IAM programs, as delegated by the DAE. The DISC4, as the Army CIO, is the MDA for ACAT IAC programs, as delegated by the AAE.

SECTION IX
TESTING AND EVALUATION

11-71. T&E strategy

a. There are three major subprocesses that support the overall management process of system acquisition. The first major subprocess is T&E. All Army acquisition programs must be supported by an integrated T&E strategy that reflects an adequate and efficient T&E program. T&E is the principal tool with which progress in system development and acquisition is measured. T&E is structured to support the defense acquisition process and user by providing essential information to decision-makers, assessing attainment of technical performance parameters, and determining whether systems are operationally effective, suitable, and survivable for intended use. Primary reasons for conducting T&E is to facilitate learning, assess technical maturity and interoperability, facilitate integration into fielded forces, and confirm performance. T&E can also assess and reduce program risk (i.e., schedule, cost, technical feasibility, technical obsolescence, and software management). The primary product of the T&E subprocess is information (hard facts) on a system so that the MDA can make informed decisions.

b. The planning, programming, and budgeting for T&E begins early in the acquisition process, concurrent with coordination of the validated MNS and ORD. Early T&E integration is accomplished through the use of the TEWIPT. The primary purpose of the TEWIPT is to optimize the use of the appropriate T&E expertise, instrumentation, targets, facilities, simulations, and models to implement test integration, thereby reducing costs to the Army. The primary product of the TEWIPT is a TEMP, previously discussed. The DUSA(OR) is the TEMP approval authority for all programs on the OSD T&E oversight list

c. Continuous evaluation (CE) is used to provide a continuous flow of information and data to decision-makers, MATDEV, and CBTDEV. The data generated in early development phases is visible and maintained as the system moves into the formal testing, thereby avoiding duplication of testing. Continuous evaluation continues through a system's post-deployment so as to verify whether the fielded system meets or exceeds thresholds and objectives for cost, performance, and support parameters.

11-72. DT and OT

a. DT encompasses models, simulation, and engineering type tests that are used to verify that design risks are minimized, system safety is certified, achievement of system technical performance is substantiated, and that readiness for OT is certified. DT generally requires instrumentation and measurements, is accomplished by engineers and technicians, is repeatable, may be environmentally controlled, and covers the complete spectrum of system capabilities. The PM shall design DT objectives appropriate to each phase and milestone.

b. OT is a field test of a system (or item) under realistic operational conditions with users who represent those expected to operate and maintain the system (or item) when it is fielded or deployed. Key OTs are:

(1) *IOT.* It is conducted before the full-rate production decision and is structured to provide data to determine the operational effectiveness, suitability, and survivability of a system operated by typical users under realistic conditions (e.g., combat and representative threat). Before an IOT commences for all programs on the OSD T&E oversight list, OSD (DOT&E) must approve the OT plan.

(2) *FOT.* FOT may be necessary during (or after) production to refine the estimates made during the IOT, provide data to examine changes, and verify that deficiencies in materiel, training, or concepts have been corrected. A FOT provides data to ensure that the system continues to meet operational needs and that it retains its effectiveness in a new environment or against a new threat.

c. OT and DT events requiring soldiers are funded through the Army's TSARC process. The TSARC is a HQDA GO/SES centralize management forum that meets semiannually to review and coordinate the resources required to support the tests to be included in the Army's five-year test program (FYTP). The TSARC is chaired by CG, ATEC. The TSARC process operates under AR 73-1. When approved for inclusion in the FYTP, a program's OTP becomes authority for tasking in the current and budget years. The OTP is an acquisition system's formal T&E resource planning and tasking document.

SECTION X
INTEGRATED LOGISTICS SUPPORT (ILS)

11-73. ILS requirements and procedures

The second major subprocess in support of acquisition system management is ILS. ILS is a disciplined, unified, and interactive approach to the management and technical activities necessary to integrate logistics support into system and equipment design. This section outlines requirements and procedures used to plan, program, develop, acquire, test, evaluate/assess, train, and deploy (concurrent with fielding of a new/modified weapon system) all the necessary support resources to ensure the supportability and readiness of the system when fielded. The ILS process ensures the support resources required to keep a system and supporting training devices in an operational ready status throughout its operational life are identified and developed in a

timely and cost effective manner. When the CBTDEV selects the best support concept during the acquisition process, he or she establishes and chairs the supportability integrated process team (SIPT), formerly known as the ILS management team (ILSMT), to provide detailed implementation of the support concept and develop the supportability strategy (SS). The MATDEV assumes the chair of the SIPT after being identified. The SIPT considers numerous alternatives and trade-offs. This supportability analysis (SA) is required to identify the optimum support system requirements. Both the MATDEV and CBTDEV perform SA tasks (either in-house or through contractors) applicable to their respective mission responsibilities as defined in AR 700-127. Life cycle software engineering centers (LCSECs) serve as members of the SIPT and provide support for the supportability analysis of software dependent systems, regardless of whether the LCSEC will perform software maintenance and support or only have a coordination role.

11-74. ILS process

a. The ILS process pursues three thrusts simultaneously. The first is design influence in order to reduce operating and support costs and simplify equipment operation and maintenance. The second concerns the design of support, identification of resources, development and acquisition of the necessary support resources, and fielding of support to assure satisfactory operation and readiness of the system. The third addresses supporting the design throughout the life of the system. The effectiveness of the first thrust reduces demands on the second. In the case of COTS/NDI acquisitions, the ILS thrust is attained by focusing on the source selection process.

b. Logistics support is a programmatic concern being an integral part of system performance including operational and performance characteristics of the system (DODI 5000.2). Thus, the effectiveness of an ILS program requires strong management, involvement, a tailored SIPT, and close coordination among SIPT members so that ILS is integrated throughout the materiel acquisition process. The integrated logistics support manager (ILSM) as the chairman of the SIPT works in conjunction with other members of the SIPT and the PM IPT. ILS strategies and requirements are developed IAW the strategies and requirements of the PM IPT. Continued coordination and cooperation between the CBTDEV and MATDEV ILS organizational elements and the PM IPT is essential.

c. In an effort to operate within resource constraints, the CBTDEV and MATDEV ILS communities generate improvements in readiness support and supportability related system design through:

(1) Jointly developing necessary MANPRINT plans and strategies.

(2) Jointly developing an early-on ILS program and SS (formerly known as the integrated logistical support plan (ILSP)).

(3) Use of SA and HSI analytical techniques for the performance of ILS program objectives.

(4) Development and/or change of doctrine, policy and procedure.

(5) Investigation of HSI, SA and other analytical techniques for deriving manpower, personnel, training and logistics impacts from the mission needs determination and other CBTDEV and MATDEV analyses.

(6) Identification of –

– Contract incentives.

– System readiness objectives (SROs).
– Modification candidates.
– Embedded training capability/options.

(7) Emphasis on commercial, other Service and allies technical advances in supportability characteristics and techniques.

d. The CBTDEV and MATDEV in coordination with the HQDA ODCSLOG, jointly establish an ILS program. The CBTDEV is principally responsible for identifying and documenting general ILS requirements and constraints through studies and analysis and for developing the SA strategy during the Phase A. Generally, lead responsibility for ILS transfers to the MATDEV upon entry into Phase B.

SECTION XI
MANPOWER AND PERSONNEL INTEGRATION (MANPRINT) PROGRAM

11-75. Seven MANPRINT domains

The third major subprocess in support of acquisition system management is the MANPRINT program. MANPRINT is the Army's application of the DOD HSI requirements in systems acquisition (DODD 5000.1 and DODI 5000.2), in compliance with Title 10. MANPRINT, described in detail in AR 602-2, is the Army's program to ensure that the "human" is fully and continuously considered as part of the total system in the development and acquisition of all systems and that human performance is always considered as part of "total system performance. MANPRINT integrates and facilitates trade-offs among the following domains but does not replace individual domain activities, responsibilities, or reporting channels:

a. Manpower. The personnel strength (military and civilian) available to the Army. Manpower refers to the consideration of the net effect of Army systems on overall human resource requirements and authorizations (spaces), to ensure that each system is affordable from the standpoint of manpower. It includes analysis of the number of people needed to operate, maintain, and support each new system being acquired, including maintenance and supply personnel, and personnel to support and conduct training. It requires a determination of the Army manpower requirements generated by the system, comparing the new manpower needs with those of the old system(s) being replaced. If an increase in personnel is required to support a new (or modified) system, "bill payers" must be identified from existing personnel accounts.

b. Personnel capabilities. Military and civilians possessing the aptitudes and grades required to operate, maintain, and support a system in peacetime and war. Personnel refers to the ability of the Army to provide qualified people in terms of specific aptitudes, experiences, and other human characteristics needed to operate, maintain, and support Army systems. It requires a detailed assessment of the aptitudes which personnel must possess in order to complete training successfully as well as operate, maintain, and support the system to the required standard. Iterative analyses must be accomplished for the system being acquired, comparing projected quantities of qualified personnel with the requirements of the new system, any system(s) being replaced, and overall Army needs for similarly qualified people. Personnel analyses and projections are needed in time to allow orderly recruitment, training, and assignment of personnel in conjunction with system fielding.

c. Training. Considerations of the necessary time and resources required to impact the requisite knowledge, skills, and abilities to qualify army personnel for operation, maintenance, and support of army systems. It involves (1) formulating and selecting engineering design

alternatives that are supportable from a training perspective (2) documenting training strategies, and (3) determining resource requirements to enable the Army training system to support system fielding. It includes analyses of the tasks that must be performed by the operator, maintainer, and supporter; the conditions under which the tasks must be performed; and the performance standards that must be met. Training is linked with personnel analyses and actions because availability of qualified personnel is a direct function of the training process.

d. Human factors engineering. Human factors engineering is the technical effort to integrate design criteria, psychological principles, and human capabilities as they relate to the design, development, test, and evaluation of systems. The human factors engineering goals are:

(1) To maximize the ability of the soldier to perform at required levels by eliminating design-induced error.

(2) To ensure materiel maintenance, support, and transport are compatible with the capabilities and limitations of the range of fully equipped soldiers who would be using such materiel. Human factors engineering provides an interface between the MANPRINT domains and system engineers. Human factors engineering supports the MANPRINT goal of developing equipment that will permit effective soldier-machine interaction within the allowable, established limits of training time, soldier aptitudes and skill, physical endurance, physiological tolerance limits, and soldier physical standards. Human factors engineering provides this support by determining the soldier's role in the materiel system, and by defining and developing soldier-materiel interface characteristics, workplace layout, and work environment.

e. System safety. The application of engineering and management principles, criteria, and techniques to optimize safety within the constraints of operational effectiveness, time, and cost throughout all phases of the system or facility life cycle.

f. Health hazards. The inherent conditions in the use, operation, maintenance, support and disposal of a system (e.g., acoustical energy, biological substances, chemical substances, oxygen deficiency, radiation energy, shock, temperature extremes, trauma, and vibration) that can cause death, injury, illness, disability, or reduce job performance of personnel.

g. Soldier survivability. A soldier within the context of MANPRINT may refer to a military or a civilian.

(1) *System.* The characteristics of a system that can reduce fratricide reduce detectability of the soldier, prevent attack if detected, prevent damage if attacked, minimize medical injury if wounded or otherwise injured, and reduce physical and mental fatigue.

(2) *Soldier.* Those characteristics of soldiers that enable them to withstand (or avoid) adverse military action or the effects of natural phenomena that would result in the loss of capability to continue effective performance of the prescribed mission.

11-76. MANPRINT objectives and concept

a. MANPRINT is intended to influence the design of developmental systems and the selection of NDI systems with the primary objective of achieving maximum total system effectiveness at a reasonable and affordable life cycle cost of ownership. The implementation of MANPRINT impacts total system performance (both effectiveness and availability) by making explicit the role that soldier performance plays and is shaped by design factors. MANPRINT also addresses the manpower, personnel, and training resources needed to achieve the required performance and, where possible, indicates more affordable configuration of manpower, personnel, and training resources.

b. The engineering design philosophy of MANPRINT is focused on optimum system performance on the battlefield, which includes consideration of both soldier and equipment capabilities and survivability. MANPRINT is an option-oriented process as opposed to an objective-oriented process. The MANPRINT process will provide decision makers information upon which to make trade-offs in areas such as quality and numbers of people, training times, technology, conditions, standards, costs, survivability, safety, health hazard risks, design and interface features, and personnel assignment policy.

c. The body of MANPRINT expertise, formerly known as the MANPRINT Joint Working Group, will continue to function through the ICT and the IPT process. The MANPRINT members of the ICT will transition to the MANPRINT WIPT when applicable. The purpose of this body is to:

(1) Assist the CBTDEV (or functional proponent) and program manager to ensure MANPRINT principles are applied to the system,

(2) Provide MANPRINT input to the MNS and the ORD.

(3) Provide a tracking system and historical database of MANPRINT issues.

SECTION XII
ACQUISITION RESOURCES MANAGEMENT

11-77. Appropriations

The "color of money," or kind of appropriation, is an important factor in acquisition management. In general, a particular appropriation can be expended only for specified activities, and money cannot be changed from one appropriation to another. Acquisition management involves at least two appropriations, and may involve four. The two-year RDTE appropriation provides funds for research, design engineering, prototype production, and test and evaluation activities in the course of developing a materiel system. The three-year procurement appropriation provides funds for procuring materiel that has been fully tested and type classified. Procurement funds are also used to procure LRIP systems for operational testing, initial spares, and support and training equipment. The Operations and Maintenance, Army (OMA) appropriation provides funds for retiring and retrograding the old equipment being replaced, for repairing systems after fielding, for fuel and ammunition for training and operations, for periodic system rebuild, for training both system operators and maintainers, except new equipment training, and, in general, anything else to keep a system in the field and operating. Some systems may require MCA appropriated funds for the construction of special facilities required for fielding that system.

11-78. Program and budget process

Funds of the correct amount and appropriation must be planned and programmed into the Army budget, in general, two years before they are needed. In the program and budget process, fund requests are initiated or reviewed annually. Congress appropriates funds for RDTE (Title V) and Procurement (Title IV) as part of the *"Defense Appropriation Act."* The RDTE and procurement appropriations must first be approved by DOD, submitted to Congress by the President, and then be authorized and appropriated in two separate congressional actions before any money can be spent. In the year of budget execution, the Army may reprogram funds, except for congressional interest items, within an appropriation subject to limits, or with prior congressional approval. Up to $4 million of RDTE and $10 million of procurement may be reprogrammed into a program without prior congressional approval (see Figure 11-10). The MATDEV is responsible for

planning and programming the RDTE and procurement funds to cover a program, and the MCA, when needed. The MATDEV is responsible for programming all life-cycle system costs for the system while the system remains under his or her management control. This includes programming for outyear sustaining resources as well as RDTE and procurement. Once the management responsibility transitions to the managing AMC "commodity command", it then becomes that command's responsibility to continue the depot-level sustaining program. The field user MACOM is responsible to program day-to-day system below-depot operational support. The field user MACOM is responsible for planning and programming the OMA funds needed to ensure continued readiness of the fielded system. Responsibility for planning and programming funds for product improvements and sustaining supply spare parts is complex and divided between the MATDEV and the field MACOM.

11-79. RDTE appropriation activities

To assist in the overall planning, programming, budgeting, and managing of the various R&D activities, the RDTE appropriation is divided into seven R&D budget activities. These categories are used throughout DOD. The current RDTE budget activities are as follows.

a. Budget Activity—Basic Research. Basic research efforts provide fundamental knowledge for the solution of identified military problems. Includes all efforts of scientific study and experimentation directed toward increasing knowledge and understanding in those fields of the physical, engineering, environmental, and life sciences related to long-term national security needs. It provides farsighted, high payoff research, including critical enabling technologies that provide the basis for technological progress. It forms a part of the base for (a) subsequent applied and advanced developments in defense-related technologies, and (b) new and improved military functional capabilities in areas such as communications, detection, tracking, surveillance, propulsion, mobility, guidance and control, navigation, energy conversion, materials and structures, and personnel support. Basic research efforts precede the system specific research described in the ASTMP.

APPN	MAX IN	MAX OUT	Level of Control	OBL AVAIL
RDTE	+ $ 4M	Greater of $ 4M or 20% of Program Element	PROGRAM ELEMENT	2 YEARS
PROC	+ $ 10M	Greater of $ 10M or 20% of Line Item	LINE ITEM	3 YEARS
OMA	+ $ 20M	No Congressional Restriction	BUDGET ACTIVITY	1 YEAR
MILCON	Lessor of + $ 2M or 25% of Project	No Congressional Restriction	PROJECT	5 YEARS

Note: Reprogramming thresholds apply to each appropriation during *entire* "active" life of that appropriation

Figure 11-10. Below Threshold Reprogramming Levels

b. Budget Activity—Applied Research. This activity translates promising basic research into solutions for broadly defined military needs, short of major development projects, with a view to developing and evaluating technical feasibility. This type of effort may vary from fairly fundamental applied research to sophisticated breadboard hardware, study, programming and

planning efforts that establish the initial feasibility and practicality of proposed solutions to technological challenges. It should thus include studies, investigation, and nonsystem specific development effort. The dominant characteristic of this category of effort is that it be pointed toward specific military OFCs/FOCs with a view toward developing and evaluating the feasibility and practicability of proposed solutions and determining their parameters. Program control of the applied research element will normally be exercised by general level of effort. Applied research precedes the system specific research described in the ASTMP.

c. Budget Activity—Advanced Technology Development. This activity includes all efforts, which have moved into the development and integration of hardware and other technology products for field experiments and tests. The results of this type of effort are proof of technological feasibility and assessment of operability and producibility that could lead to the development of hardware for Service use. It also includes ATDs that help expedite technology transition from the laboratory to operational use. Projects in this category have a direct relevance to identified military needs. Advanced technology development may include concept exploration as described in the ASTMP, but is nonsystem specific.

d. Budget Activity—Demonstration and Validation. Includes all efforts associated with advanced technology development used to demonstrate the general military utility or cost reduction potential of technology when applied to different types of military equipment or techniques. It includes evaluation, synthetic environment, prototypes, and proof-of-principle demonstrations in field exercises to evaluate system upgrades or provide new operational capabilities. The demonstrations evaluate integrated technologies in as realistic an operating environment as possible to assess the performance or cost reduction potential of advanced technology. It may include concept exploration as well as program definition and risk reduction as described in DODD 5000.1, but is system specific.

e. Budget Activity—Engineering and Manufacturing Development. Includes those projects in engineering and manufacturing development for Service use. This area is characterized by major line item projects and program control is exercised by review of individual projects. Includes engineering and manufacturing development projects as described in DODD 5000.1, and may include OT. DODD 5000.1 changed the acquisition phase names that Budget Activities 4 and 5 support from program definition and risk reduction (phase I) and engineering and manufacturing development (phase II) to phase B – system development and demonstration.

f. Budget Activity—RDTE Management and Support. Includes efforts directed toward support of RDTE installations or operations required for use in general research and development (R&D) and not allocable to specific R&D missions. Included are technical integration efforts, technical information activities, space programs, major test ranges, test facilities and general test instrumentation, target development, support of operational tests, international cooperative R&D, and R&D support.

g. Budget Activity—Operational System Development. Includes R&D effort directed toward development, engineering, and test of changes to fielded systems or systems already in procurement which alter the performance envelopes. Operational system development may include OT costs. FY01 R&D support to miscellaneous operational efforts include: Combat Vehicle Product Improvement Program (PIP), MLRS PIP, Horizontal Battlefield Digitization, Satellite Communication Ground Environment, etc. Program control is exercised by review of individual projects.

11-80. Procurement appropriations

The procurement appropriation funds the procurement of materiel systems that has been fully tested and type classified. The army budget includes six separate procurement appropriations:

a. Aircraft Appropriation. Aircraft procurement includes the procurement of aircraft, aircraft modifications, spares, repair parts, and related support equipment and facilities.

b. Missile Appropriation. Missile procurement includes the procurement of missiles, missiles modifications, spares, repair parts, and related support equipment and facilities.

c. Weapons and Tracked Combat Vehicles (WTCV) Appropriation. WTCV procurement includes tracked and combat vehicles, weapons, other combat vehicles, and repair parts.

d. Ammunition Appropriation. Ammunition procurement includes procurement of ammunition end items, ammunition production base support, and ammunition demilitarization.

e. Other Procurement, Army (OPA) Appropriation. OPA covers three major categories: (1) tactical and support vehicles, (2) communications and electronic equipment, and (3) other support equipment.

11-81. Research, development, and acquisition plan (RDA plan)

a. The FY02-16 RDA planning process began with the construction of the FY02-07 RDA POM and continues with the development of the FY02 BES and the FY02 President's Budget. During each of these three stages, the extended planning period (EPP), FY08-16, is revised to ensure a reasonable progression from the period FY02-07.

b. The ODCSOPS RDA database represents the RDA plan. The principal elements of the RDA database, management decision packages (MDEPs), are grouped by budget operating system (BOS). A BOS is a set of MDEPs that represent a common function on the battlefield or a common activity of the supporting Army infrastructure. A HQDA division manages each BOS. The division chief (known as the BOS manager), assisted by his or her staff and his or her ASA(ALT)/DISC4 counterparts determines the requirements and priorities of the MDEPs of his or her BOS.

c. The Army RDA plan is a 15-year plan for the development and production of technologies and materiel to advance Army modernization. Modernization is "the continuous process of integrating new doctrine, training, organization and equipment to develop and field warfighting capabilities for the total force." Under ideal circumstances Army modernization would be fully supported by an unconstrained RDA program. However, the realities of limited resources restrict modernization to those efforts that are both technically and fiscally achievable. The RDA plan, therefore, is the result of a process that converts the Army's unconstrained planning environment into a constrained RDA program that maximizes warfighting capabilities and supporting infrastructure requirements within limited resources.

d. The RDA plan assumes the form of a 1-N priority list of RDTE/procurement program packages called MDEPs with funding streams for the entire 15-year planning period. An MDEP represents a particular program, function or organization and displays the resources (dollars, system quantities, civilian and military manpower) needed to achieve an intended goal. An MDEP may receive its resources (funding streams) from any number of appropriations; the RDA plan, however, includes only the RDTE and procurement funding streams of its MDEPs. There is no limitation to the number of commands to which the resources of an MDEP may be assigned. The RDA plan is recorded in and represented by the ODCSOPS RDA database.

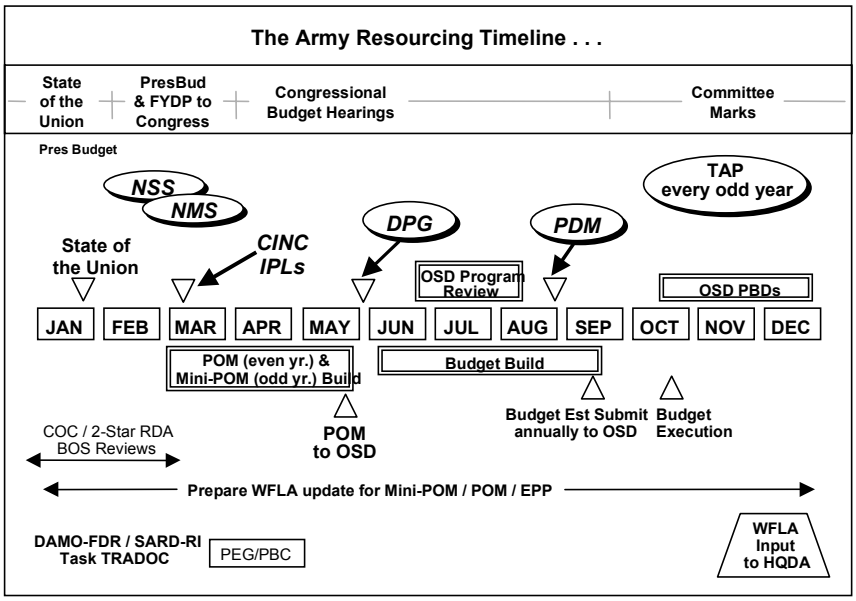
e. The RDA plan is a continual process comprising periodic revisions to the 15-year planning period of the RDA database. The revisions occur during the three principal stages of the PPBES cycle: the POM, BES and President's Budget process. During each of these three stages, the Army adjusts the first six years of the 15-year planning period. After each stage, the Army's RDA community adjusts the final nine years, called the EPP, to ensure a smooth and reasonable progression from the FYDP to EPP. The 15-year planning period of the RDA database moves forward by two years each alternate January to conform to the OSD requirement for a biennial POM and budget. The FY02-16 RDA Plan began in January 2000; the FY04-18 RDA Plan will begin in January 2002.

f. During the second year of the biennial budget cycle, the Army develops a POM update of the preceding year's POM. The update includes years two through five of the planning period. In 2000, the POM covered FY02-07; in FY2001 the POM update will cover FY03-07. Similarly, the FY02-16 RDA Plan of 2000 will undergo an update in 2001; the update will cover FY03-16. By definition the RDA plan includes the funding lines of the RDTE and procurement appropriations only. The equipping program evaluation group (EE PEG) develops and issues the RDA plan, which includes the RDTE and procurement lines of all PEGs. The EE PEG is responsible for about 90 percent of the RDA program dollars and, also, for a limited number of non-RDA programs. To facilitate management of its total program, the EE PEG places the non-RDA funding streams of its MDEPs in the database of the RDA plan. The non-RDA funding streams are not part of the RDA plan; they are simply displayed in the RDA plan database. The non-RDA funding streams have no EPP.

11-82. TRADOC warfighting lens analysis (WFLA)

a. WFLA exists for two reasons: to provide materiel resourcing recommendations to HQDA and to support TRADOC's mission as "Architect of the Future Army". WFLA is the TRADOC vehicle for materiel resourcing recommendations to HQDA to ensure linkage with PPBES (see Figure 11-11). TRADOC uses WFLA to provide input to the Army's RDA plan and POM considerations. It is derived from a warfighter's assessment of future battlefield requirements based on analysis.

Figure 11-11. Warfighting Lens Analysis (WFLA)



b. The materiel requirements determination process begins at the TRADOC schools and proponencies. TRADOC assesses and integrates branch/proponent recommendations through the WFLA process. WFLA compares required future operational capabilities (OFCs/FOCs) of the total force against fiscal constraints in order to determine modernization needs. These priorities are established according to their objective measure of relative value to mission accomplishment. Recommendations are then developed to address those needs. WFLA modernization recommendations are provided to HQDA to ensure a balanced modernized warfighting capability for future Army.

c. TRADOC provides WFLA recommendations to DA as key input for POM (December odd year) and, if needed, for mini-POM (December even year). WFLA is a living, evolving process and is initiated/updated each cycle through TRADOC implementation guidance developed to meet HQDA current year guidance.

11-83. Program stability

Achieving early program objective consensus and following a good investment strategy will yield a stable program, clearly showing where we are today and where we want to be when we bring on the new system. To be successful, new systems acquisition programs must be developed and acquired in a timely and economical manner. Life-cycle cost estimates and changes to programs and schedules must be controlled. Changes to programs affecting established goals will be fully documented in the program management documentation, providing the justification for change (i.e., budget cut, design change). After entering Phase B (System Development and Demonstration), design changes in system components that are meeting the approved requirement are discouraged and must be individually justified. The design should be frozen in sufficient time prior to DT and OT to provide an adequate system support package for testing. Changes to programs as a result of DT/OT must be of the "objective" nature to satisfy the requirement and not a "threshold" type of change, unless it can be demonstrated that the change will not have a significantly negative impact on the cost, schedule, producibility, and ILS aspects of the program.

SECTION XIII
ACQUISITION REFORM

11-84. Reform process

a. With a wide range of missions, global uncertainty, increased global technology transfer, and limited RDA resources, the Army has been a leader in acquisition reform. For example, the TRADOC battle labs and the AWEs have shown to be critical in simulating, experimenting, and assessing advanced technologies and concepts, thereby accelerating and improving both the requirement determination and acquisition processes. Every ATD is required to be sponsored by a TRADOC battle lab and have at least one experiment performed at a battle lab. The ACT II program, previously discussed, is funding competitively selected proposals from industry to demonstrate promising technology and prototypes of keen interest to all the battle labs in satisfying priority OFCs/FOCs. The OSD ACTD initiative allows rapid prototyping of promising technologies that provide real capabilities for the joint warfighting customer to evaluate.

b. A new partnership has been established among warfighter, Army acquisition, and industry organizations to identify technology options more quickly, establish the best technical approaches, conduct solid price-benefit trade studies, develop performance requirements, program the funding needed, and issue concise solicitations consistent with the foregoing. The battle labs, HTI ICTs, and team efforts such as Team Comanche and Team Crusader are examples of the power of IPPD and IPTs that bring the stakeholders together to solve tough acquisition and requirements tasks concurrently and quickly. The Army continues to overcome organizational stovepipes and is mastering HTI and information technology in a timely and affordable manner.

c. Another consideration in the acquisition reform process is how the Army deals with industry. Through performance specifications and streamlined, tailored, page-limited solicitations, the Army gives them maximum flexibility by telling them what it wants as an end item and not how to do it or how to get there. Furthermore, the Army leverages commercial technologies, products, and processes and establishes open architectures that facilitate future upgrades, using to advantage the commercial information technology revolution and rapid advances in computers. These initiatives have shortened acquisition times for quality upgrades, reduced life-cycle costs, and allowed the acquisition community to easily integrate exciting new technologies as they become available. A highly successful process to focus and leverage all of our acquisition reform initiatives in support of Army XXI is the acquisition reform reinvention centers and laboratories.

11-85. Army XXI reinvention centers

In the past several years, the SA has delegated far-reaching authorities to Army XXI reinvention centers in order to reengineer processes and redesign organizations to support core competencies required for the U.S. Army in the 21st century. To accomplish the Army's missions in an era of declining resources, it must complete a plan that will make it a more flexible organization that can reach out to both the fighting and sustaining elements of Army XXI with the best concepts and technologies available in the future. The reinvention center designation allows the Army to mass ongoing initiatives to overpower many current restraints impacting the Army's mission. The SA has designated three reinvention centers: FORSCOM, TRADOC, and HQDA. The authorities delegated by the SA to these three reinvention centers in pursuing reinvention efforts are:

- Coordination Authority: permission to deal directly with OSD and other reinvention centers or laboratories without having to go through the DA staff first.

- Authority regulatory waiver: permission to waive DA and MACOM regulations, directives, instructions, and/or publications, with certain limitations.
- Legislative change proposal authority: permission to submit proposed legislative changes directly to the Office of the Chief of Legislative Liaison (OCLL) without having to filter through the DA staff.
- Lab and prototype authority: Permission to designate reinvention center laboratories and prototypes, as needed, with no reporting requirements outside of the reinvention center.

11-86. Army XXI Acquisition Reform Reinvention Laboratory

a. The Army XXI Acquisition Reform Reinvention Laboratory was approved by the SA and CSA on 1 July, 1996. The Reinvention Lab's focused goal was to identify, test, procure, and field technically advanced systems and equipment for Army XXI by the year 2000. The Reinvention Lab process will enable the Army to use acquisition reforms effectively, to take high value technologies from prototype status following AWE and convert them into fieldable materiel systems and equipment in time to field the first Army XXI digitized division by 2001 and the first Army XXI corps by 2004.

b. The Acquisition Reform Reinvention Laboratory is a conglomerate of 94 acquisition reform initiatives involving everything from lower staff levels at brigade headquarters to new software, hardware, acquisition processes and paperwork reduction. It takes advantage of every acquisition time and cost cutting initiative given to the Army by Congress and DOD, including simplifying procedures, using commercial practices, streamlining processes, and using commercial credit cards and electronic commerce. The Reinvention Lab is responsible for making efficient and effective all processes involved in the acquisition and fielding of equipment for Army XXI. The WRAP is the primary streamlining process used by the Reinvention Lab to accomplish its Army XXI goals.

11-87. Warfighting Rapid Acquisition Program (WRAP)

a. WRAP. The WRAP was established on 11 April, 1996 primarily to accelerate fielding of systems and technology that emerge from TRADOC battle lab warfighting experiments. WRAP applies to AWEs, CEPs, ATDs, ACTDs and similar experiments where a TRADOC-led ICT supported by a TRADOC battle lab are directly involved. Normally, such systems and technology emerge from the experimentation process as unfinanced "new starts." If an approved new start cannot be acquired under existing MDA authorities and funding, the CG, TRADOC can initiate a WRAP ASARC to obtain approval of candidates based on compelling experimentation success and urgency of need. Supporting criteria include: technical merit and maturity, criticality and priority to warfighting requirements, affordability, effectiveness, and supportability and sustainability into the next Army POM. Successful WRAP candidates are ranked by priority and receive funding for operational prototypes in priority order.

b. WRAP ASARC. The WRAP ASARC is normally scheduled in the March-April and August-September time frames, to identify what projects to fund and to accommodate PPBES actions. A WRAP ASARC can be held at other times if appropriate. When convened by the CG, TRADOC the WRAP ASARC:

(1) Reviews requirements and urgency.

(2) Reviews affordability.

(3) Reviews experimentation results.

(4) Approves the AS.

(5) Assigns management responsibility to an AMC advanced concepts manager (ACM) or designates PEO/PM.

(6) Assigns a milestone entry point, as appropriate.

(7) Approves a funding strategy.

c. WRAP documentation. The MNS is the normal document needed to support TRADOC AWEs. A MNS is not required if an OFC/FOC list can support the WRAP requirement traceability. For candidates selected for rapid acquisition, a streamlined operational requirement statement (ORS) is sufficient to support the WRAP ASARC and for documentation during the two years before regular programming begins. Items not approved for rapid acquisition will convert to normal documentation over a set time period. The ORS for rapid acquisition is not a requirements document. The format is provided in Appendix C, AR 71-9. Supplementary WRAP documentation normally includes: urgency of need statement, experimentation results documenting compelling success, proposed AS, and a budget estimate for the proposed program.

d. WRAP funding. In the *FY97 Appropriation Act*, Congress approved an Army budget line dedicated for WRAP initiatives. Financing from this line is used to jump start technology programs and field limited quantities of approved requirements emerging from the Force XXI process as quickly as possible, without having to reprogram funds from other budget lines. Financing in this manner is limited to providing enough funds only to bridge the gap (normally two years) until the total funding requirements for a new start can be budgeted. WRAP initiatives can also be funded through reprioritizing or reprogramming activities. The execution of WRAP initiatives funding is subject to approval from the WRAP ASARC, which oversees WRAP efforts. The ASA(ALT) directs and controls the Army XXI acquisition reform efforts through the Deputy for Systems Management and HTI, who functions as the Director of the Reinvention Laboratory. WRAP will not initiate any new projects in FY01 as a result of reprogramming actions to fund the Army's new Transformation Strategy.

11-88. Horizontal technology integration (HTI)

a. The Army's requirements and modernization processes must be an efficient, effective, and flexible force coping with the rapid changing technology and socio-political environments to provide the warfighter timely, innovative solutions providing or maintaining the edge in all missions. Today, the HTI program is the Army's primary modernization initiative providing a holistic approach to requirements determination; early enjoinment of the requirements, acquisition, and user communities in a team effort; and aggressive exploitation of leading edge technologies.

b. HTI is the Army's modernization strategy for the future--upgrading existing weapon systems instead of developing new ones. Through HTI, the Army upgrades the force, maintains its technological edge on the battlefield, and enhances its combat power through the synergy of applying synchronized and common technologies across the force rather than to one or a few systems. HTI breaks away from the traditional "mission specific" modernization approach. Second generation forward looking infrared (FLIR) capability, Battlefield Combat Identification System (BCIS), battlefield digitization, survivability enhancement systems, Combat Identification Dismounted Soldier System (CIDSS), driver's vision enhancement (DVE), thermal weapons sight (TWS), embedded diagnostics, tactical lasers, and Force XXI Battle Command Brigade and Below System (FBCB2) are the major HTI efforts underway at this time. These ten enabling technology programs provide capabilities that, when combined, enable the Army to reduce fratricide, improve situational awareness, firepower effectiveness, and command and control.

c. HTI is defined as the application of common enabling technologies across multiple systems to improve the overall warfighting capability of the force; lowering research and development costs and development time; and obtaining lower unit production costs by procuring larger quantities of the same subsystem for different weapons systems. The Army also benefits from a common logistics base for the same subsystems on multiple platforms. Above all, HTI provides the warfighter with the necessary improvements in lethality, survivability, and tempo to defeat any threat on the 21st century battlefield. HTI depends upon the use of CBTDEV-led ICTs for horizontal requirements integration and MATDEV-led IPTs for program development and execution.

d. HTI is implemented within the framework of existing acquisition processes, structures and organizations. A HQDA general officer working group (GOWG) is the central authority for all formal Army HTI initiatives and programs. The GOWG is co-chaired by the ADCSPRO-FD and the ASA(ALT) Deputy for Systems Management and HTI. GOWG members include HQDA representatives from ODCSOPS, ODCSPRO, ASA(ALT), ASA(FM&C), DISC4, and PA&E, along with TRADOC, AMC, and ATEC representatives. They establish the HTI "blueprint", synchronize and prioritize efforts, provide specific guidance, resolve issues, and provide general officer-level direction, guidance, and oversight. In addition, the ASA(ALT) Deputy for Systems Management and HTI acts as the Army HTI executive agent and determines, coordinates, and issues specific guidance for HTI programs implemented across multiple PEO/PM structures and organizations.

e. The HTI process begins with an operational concept, OFC/FOC, or system requirement. The appropriate management structure is then chartered to implement an HTI initiative through the application of specific programs. HTI initiatives follow established acquisition management procedures. The ASA(ALT) ensures the technology insertion is completely synchronized through management oversight of the respective Army laboratory, Army RDECs, PEOs and PMs. The individual HTI efforts are managed as a part of planned (STOs), new system developments, and/or system modifications. This increased management focus ensures that the technology development plan or weapon system acquisition strategies/plans are designed with an overall horizontal approach to development and execution. This includes possible joint service, allied nation or industry applications. HTI initiatives are resourced through individual MDEPs on a case by case basis. There is an MDEP established to provide funding for both common, government-furnished hardware, and for the actual insertion and integration of the common hardware onto the designated weapon systems. As a process, HTI supports an integrated battlefield architecture that exploits the capabilities of combat, materiel and training developers, national laboratories, industry and academia to achieve total force synergism. Its purpose is to provide increased modernization efficiency and responsiveness while enhancing overall force warfighting effectiveness. As the HTI process matures, the need to create centralized funding lines, specific charters and requirements documents, along with creating specific task forces or PM organizations, are addressed.

f. Some potential challenges or disadvantages to using an HTI acquisition approach are acknowledged. Realigning program schedules, changing technical approaches, and altering funding strategies in order to horizontally insert technology or implement product improvements could result in higher up-front costs. Major modifications of certain older generation systems may also be required for those systems to accept newer technology. Additionally, funding the technology insertion for several different systems must be consistent and executable. HTI needs to be a basic part of program development and planning. However, HTI principles are applied only where it makes sense for total force efficiency and effectiveness. AR 70-1 provides more detailed information on HTI planning and execution.

11-89. Simulation and modeling for acquisition, requirements, and training (SMART)

a. SMART is an initiative to integrate M&S into Army business processes. Army SMART goals are to reduce the time required to field systems, reduce total ownership costs, and increase the military utility of fielded systems.

b. The SMART concept, first adopted by the Army in 1997, capitalizes on M&S tools and technologies to address system development, operational readiness, and life cycle cost. This is accomplished through the collaborative efforts of the requirements, training and operations, and acquisition communities. The AAE has indicated that the SMART initiative is a key mechanism to achieving *The Army Vision* and building the objective force.

c. SMART is a framework to accomplish the vision of a disciplined, collaborative environment to reduce costs and time of providing solutions for Army needs. Key components are the ability to exchange data, algorithms, software and other information. SMART will yield four significant benefits that are key to Army Transformation:

(1) Reduced total ownership costs and sustainment burden for fielded systems throughout their service lives.

(2) Reduced time required for concept exploration, concept development, and fielding new or upgraded systems.

(3) Increased military worth of fielded systems while simultaneously optimizing force structure, doctrine, tactics, techniques and procedures.

(4) Concurrent fielding of systems with their system and non-system training devices.

d. The SMART concept is to leverage information technology to improve the processes that will lead to Army modernization. The ultimate end state is one of conducting these activities almost entirely digitally. The SMART vision includes two paths toward a fully mission ready force. Greater reliance will be placed on information technology tools to address DTLOMS solutions. Under SMART, achieving full mission readiness to address a new requirement in lieu of a materiel solution involves using M&S tools to develop changes in doctrine, organizational structure, training, and leadership. When a materiel solution is the answer, the same tools, in conjunction with numerous others, will be used to determine, design, test, evaluate, demonstrate and train on a hardware or software solution to satisfy all requirements from a holistic perspective.

e. It must be understood that SMART is not about eliminating all live activities associated with system development, testing, and operation. SMART is about gaining the maximum effectiveness and efficiency in our system design, development, fielding, maintenance, and testing through efficient human interface with information technology across the domains of training, analysis and acquisition. To accomplish all of the system development life cycle solely with computer-based models requires significant maturation of the mathematics and statistics that apply to the use of models, as well as considerable advancement in our ability to describe and reason about nonlinear systems. Gaining such technological ability does not imply an abandonment of contact with reality. Real systems will continue to be tested and soldiers will continue to train live. Such live activities, however, will be conducted, having benefited from the insights, efficiencies, and cost effectiveness of advanced computer based activities. Likewise, computer based activities should leverage the realism and insight that comes from live activities: this would constantly improve the fidelity of computer based models and algorithms

f. SMART is enabled by more than just M&S. Successful execution of SMART requires many different enablers such as:

(1) Supportive processes, policies, and laws.

(2) Means to identify, obtain and protect reusable resources.

(3) Data interchange standards to foster consistent understanding of shared information.

(4) Standards for software interoperability.

(5) Standards for credible verification and validation of M&S.

(6) M&S that validly represents the relevant entities, attributes and interactions, including performance of human decision makers and operators.

(7) Tools and methods to manage cross domain collaboration.

(8) Competent and motivated professionals

(9) Leadership commitment and support at all levels.

(10) Data management.

g. Addressing system development, ownership costs, and training to modernize more quickly, effectively, and affordably, is not possible through the efforts of the acquisition workforce alone. It requires the up-front and continued collaboration among the CBTDEV/MATDEV/TNGDEV communities. In order to influence Army Transformation as soon as possible, the Army Model and Simulation Office (an ODCSOPS directorate) is responsible for implementing the SMART Execution Plan beginning in FY 2001.

h. SMART is the process that the Army will use to harness the power of the digital information age. Through modeling and simulation, the Army will gain the electronic agility that has never been available. The Army can now visualize the effectiveness of system as it develops its requirements. SMART offers the Army an effective means of engaging the soldier directly in the acquisition process. The Army can now develop insights into whether equipment designs need to be modified or changes in tactics are necessary, or both. The application of SMART will have a major impact on future Army capabilities and provides the means to reach the objective force faster.

SECTION XIV
SUMMARY AND REFERENCES

11-90. Summary

a. This chapter provided a basic introduction to the management process, organization, and structure of research, development, and acquisition. Through the chapter description, the reader should gain an appreciation of the logic of the process, its organization and management. This chapter also highlights the current basic policies for materiel acquisition, recently updated DOD and Army policies for materiel systems, the Army's acquisition objectives, and descriptions of acquisition managers.

b. Difficult decisions, a scarcity of dollar resources, and honest differences of opinion cause disruptions and delays. It is unlikely that there will be total agreement on the best technical approach to satisfy a need--or, indeed, on the need itself. The annual budget cycle and budget constraints almost ensure that some projects will not be funded at the level desired--if at all. Tests are not always successful. Estimates of time, costs, effectiveness, and technical feasibility are often wide of the mark for complex systems. After all, they are estimates that are projected well into the future based on sketchy data. These real-world problems reinforce the fact that

RDA management is a complex task of great importance to national defense. RDA can be a wellspring of new and effective weapons systems where effective management and professionalism can make the difference on any future battlefield. As with any activity involving the use of scarce resources to meet organizational goals and objectives, the people involved—the acquisition managers and the soldier users and maintainers—constitute the most vital link to mission accomplishment.

11-91. References

a. *Federal Acquisition Streamlining Act of 1994*, 13 October 1994.

b. *The Defense Acquisition Workforce Improvement Act (DAWIA),* Public Law 101-510, Title XIII, 10 USC 1701-1764, *National Defense Authorization Act for 1991*.

c. DOD Directive 5000.1, *The Defense Acquisition System*.

d. DOD Directive 5000.52, *Defense Acquisition Education, Training and Career Development Program.*

e. DOD Instruction 5000.2, *Operation of the Defense Acquisition System*.

f. DOD Memorandum, M*andatory Procedures for MDAPs and MAIS Acquisition Programs*, 23 October 2000.

g. *DOD Science and Technology Strategy*, May 2000.

h. *DOD Basic Research Plan (BRP),* February 1999.

i. *DOD Technology Area Plan*, February 2000.

j. *DOD Joint Warfighting Science and Technology Plan*, February 2000.

k. *DOD Defense Technology Objectives of the JWSTP and DTAP,* February 2000.

l. *Defense Acquisition Deskbook, Software Version 3.3*, 29 September 2000.

m. *Defense Systems Management College, Introduction to Defense Acquisition Management,* June 1996.

n. *Deputy Secretary of Defense Memorandum, Elimination of the Major Automated Information System Review Council*, 28 July 1998.

o. *Under Secretary of Defense (Acquisition, Technology, and Logistics) Memorandum, Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs*, 23 October 2000.

p. Chairman of the Joint Chiefs of Staff Instruction 3170.01A, *Requirements Generation Process*.

q. Chairman of the Joint Chiefs of Staff Instruction 6212.01B, *Interoperability and Supportability of National Security Systems, and Information Technology Systems*.

r. Army Regulation 15-38, *Test Schedule and Review Committee*.

s. Army Regulation 70-1, *Army Acquisition Policy*.

t. Army Regulation 70-75, *Survivability of Army Personnel and Materiel*.

u. Army Regulation 71-9, *Materiel Requirements*.

v. Army Regulation 73-1, *Test and Evaluation Policy*.

w. Army Regulation 602-2, *Manpower and Personnel Integration (MANPRINT) in the System Acquisition Process*.

x. Army Regulation 700-127, *Integrated Logistics Support*.

y. DA Pamphlet 70-3, *Army Acquisition Procedures*.

z. DA Pamphlet 73-1 , *Test and Evaluation in Support of System Acquisition*.

aa. DA Pamphlet 73-2, *Test and Evaluation Master Plan Procedures and Guidelines*.

bb. DA Pamphlet 73-3, *Critical Operational Issue and Criteria (COIC) Procedures and Guidelines*.

cc. DA Pamphlet 73-4, *Developmental Test and Evaluation Guidelines*.

dd. DA Pamphlet 73-5, *Operational Test and Evaluation*.

ee. DA Pamphlet 73-6, *Live Fire Test and Evaluation Guidelines*.

ff. DA Pamphlet 73-7, *Software Test and Evaluation*.

gg. DA Pamphlet 700-142, *Instructions for Materiel Release, Fielding, and Transfer*.

hh. *Secretary of the Army Memorandum, Transfer of Logistics Functions*, 16 February 1999.

ii. *Assistant Secretary of the Army (Research, Development and Acquisition) Memorandum, Fast Track Acquisition Policy*, 30 June 1997.

jj. *Assistant Secretary of the Army (Acquisition, Logistics, and Technology), 1999 Development, Acquisition, and Fielding Strategy*.

kk. *Assistant Secretary of the Army (Research, Development, and Acquisition) Memorandum, Elimination of the Major Automated Information System Review Council*, 8 September 1998.

ll. *Office, Chief of Staff, Army Vision Statement*, 12 *October* 1999.

mm. *FY 98 Army Science and Technology Master Plan*, Vols. I and II, 19 March 1998.

nn. *The United States Army 1998 Modernization Plan*, 13 April 1998.

oo. *The Army Systems Survivability Strategy*, December 1996.

pp. Army Information Paper, *Army XXI Acquisition Reform Reinvention Laboratory*, 10 June 1995.

qq. TRADOC Black Book #3, *Requirements Determination Process*, 22 March 1996.

rr. TRADOC Pamphlet 71-9, *Requirements Determination*.

ss. TRADOC Pamphlet 525-66 (Draft), *Objective Force Capability*.

tt. AMC Pamphlet 70-2, Integrated Product and Process Management